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LIVERPOOL AND MANCHESTER

MEDICAL AND SURGICAL REPORTS.

ON PSEUDO-HYPERTROPHIC PARALYSIS.

OR

PARALYSIE MYO-SCLÉROSIQUE OF DUCHENNE (de Boulogne).

By Wm. H. BARLOW, M.D.,
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3,

The interesting and curious disease which forms the subject of my paper was first described by Dr. Duchenne (de Boulogne) in the year 1861, in the second edition of his admirable work on 'Localised Electricity,' published in Paris in that year. As he himself relates ('Archives Générales de Méd.,' 1868), the discovery of this affection dates from the year 1858, when a child, which had been struck with a paralysis of an unaccustomed form, was sent to his civil clinique by his friend M. Bouvier. "Having collected," he goes on to say, "in three years certain facts absolutely similar, and to which I did not know anything analogous in science, I believed myself entitled to consider that muscular affection as a morbid species not yet described and peculiar to infancy. Faithful to the rule of conduct which I had imposed upon myself in my previous pathological studies, I reserved my fuller description until I could rest upon a more numerous collection of facts, and matured by time." Thus it was not until 1868, that he published in the 'Archives Générales de Médecine' his "Recherches sur la Paralysie Musculaire Pseudo-Hypertrophique, ou Paralysie Myo-sclérosique," a full and comprehensive account of the history and probable nature of this disease. Previous to all these, however, a paper was read (December 9th, 1851) before the Royal Medical and Chirurgical Society by Dr. Edward Meryon, wherein were narrated the histories of four brothers, the subjects of "a new or at least as yet undescribed form of paralysis," which from the symptoms observed during life, and the condition of the muscles after death, would appear to have been really cases of this disease. He also mentions in the same paper four other cases, two of whom were brothers named Lymell, of Playden in Sussex; and other two also brothers, one of whose cases is reported by Partridge, having been brought before the Royal Medical and Chirurgical Society in 1847, and a summary published in the 'Medical Gazette' for November in that year. There is a still earlier case published by Stanley ('Medical Gazette,' February, 1840), which was *probably* of this nature; but as to Partridge's case it is scarcely open to doubt. It occurred (Partridge's case) in a boy of fourteen, who died after an attack of measles, having been subject to gradually increasing paralysis for five years. "The deltoid and sterno-mastoid muscles had undergone fatty degeneration."* "The calves (which were larger than natural, and had during the progress of the paralysis become permanently contracted) presented a greater degree of fatty degeneration in the muscular structure than the upper extremities." In his contribution to the 'Archives Générales de Médecine' M. Duchenne mentions 13 cases which had come under his own observation, and 15 which had been published at that date by other observers, including 4 cases in the same family by Mr. Heller ('Deutsches Archiv f. Klin. Med.,' tom. i, 616-629, 1865), 3 cases in one family by M. Seidel ('Centralblatt,' 1867, p. 666), 2 cases by M. Wernich ('Klin. zu Königsberg'), 'Deutsches (Archiv f. Klin. Med.,' t. ii, p. 232-241, 1864), and single cases by Schutzenberger, Jaksch, Berend, Eulenberg and Cohnheim,

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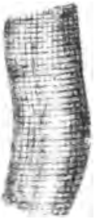
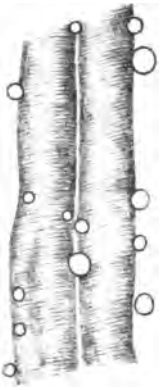
* See 'Microscopic Condition of Muscles.'

Fig 1



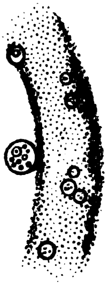
1. *Normal Muscular fibre.* × 250.

Fig 2.



2. *Two Muscular fibres from Pseudo-Hypertrophic Paralysis, shewing fine transverse striæ and oil globules.* × 250.

Fig 3.



3. *Muscular fibre from advanced stage of Infantile Paralysis, transverse striæ destroyed and fibre in a state of fatty degeneration.* × 250.

Fig 4.

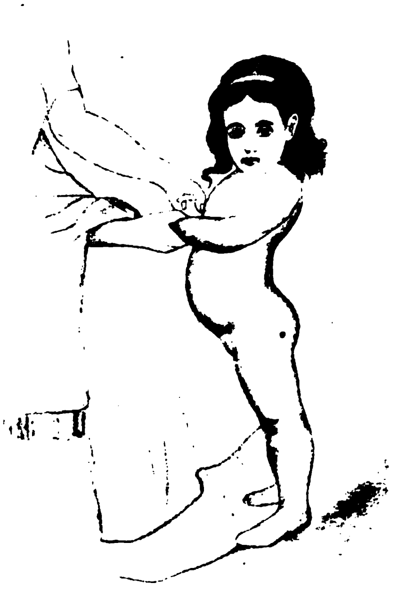
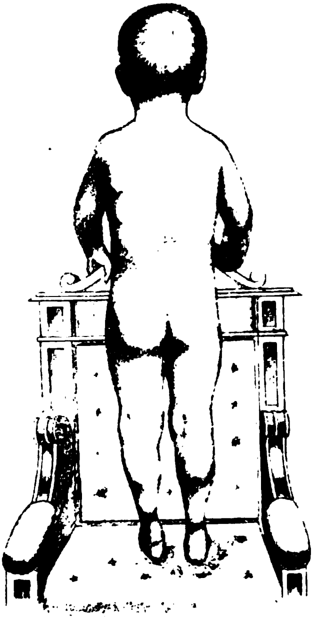


Fig 5.



J Broadbent Del.

A Macgregor Litho. Manche

Oppolzer of Vienna, and Greisinger, at the date of his third edition of 'L'Electrisation Localisée,' 1872, he had gathered a total of 40 cases, without counting those he had met with in 1871 in the hospitals of London, and since then the number has considerably increased. In our own country Dr. Hillier and Mr. Adams each published a case in the 'Pathological Society's Transactions' for 1867-8. Mr. Butler also published a case, Mr. Kesteven 3 cases, and Dr. Langdon Down 2 cases, in 'Journal of Mental Science' in 1871. Dr. B. W. Foster published 3 cases in 'Lancet' for May 8th, 1869. Dr. Davidson 3 cases ('Glasgow Med. Journal,' 1872); Hutchinson ('Lancet,' July, 1873); Lake (idem, vol. ii, p. 113, 1873). Lockhart Clarke and Dr. Gowers ('Med. Chir. Trans.,' vol. 57, 1874); and W. M. Ord, M.B. ('Med. Chir. Trans.' vol. 57, 1874). In America, Hammond, 1871; Ingalls and Webber, Dr. Pepper and S. Weir Mitchell, 1871; E. M. Estrazulas, 1873, &c. And on the Continent, since Duchenne wrote last, Skoda ('Wien. Med. Presse,' xii, 28); Arnold ('Wurtemb. Corr.-Bl.,' xli, 15); Chvostek ('Œsterr. Ztsch. f. Prakt. Heilkund.,' xvii); Charcot ('Archiv. de Physiol., iv); Knoll ('Wien. Med. Jahrb.,' cliv); Orse ('Gazz. Lomb., 15); Dahlerup ('Nord. Med. Ark.'); and Enrico de Renze ('Il Morgagni,' vol. xv). There is also a case reported by Niemeyer, and no doubt some few others, which may have escaped my researches.

The name first given to this disease by Duchenne was "Paraplégie hypertrophique de l'enfance, de cause cérébrale;" he has, however, since then found cause to alter his opinion, and is content now with the name he places at the head of this treatise in the 'Archives Générales de Médecine.' Jaccoud calls it, and with him agree most English and American writers, "Sclérose musculaire progressive," after Requin, progressive muscular sclerosis. Heller proposed to call it "Lipomatosis musculorum luxurians," and many other names have been proposed by various writers; but the two which I have used in the title of this paper seem to me to be the best and most descriptive, the former of the prominent and striking feature to the outward observer, and the latter of the pathological muscular change. Duchenne objects to the term "progressive," for reasons to be mentioned later on.

The number of cases which have been published since Duchenne first described the characteristic symptoms of the affection and the increasing number of those reported in the various medical publications, both here and abroad, make it probable that these are by no means so rare as at first appeared; and that, with a wider knowledge of the diagnostic marks which distinguish this from other paralyses of childhood, the proportion of recorded cases will still increase.

Symptoms.—The principal morbid phenomena are, as Duchenne gives them—

1st. In the beginning, feebleness of the lower limbs.

2nd. Lateral balancings of the trunk and widening of the legs during walking.

3rd. A peculiar curvature of the spine (ensellure), or saddle-back (lordosis), both in walking and standing.

4th. Equinism (talipes equinus), with a peculiar over-extension of the first phalanges of the toes, which Duchenne calls "griffe des orteils."

5th. Apparent muscular hypertrophy.

6th. Stationary condition.

7th. Generalisation and aggravation of the paralysis.

When the disease has arrived at the stage of apparent hypertrophy, the appearance of the patient is very characteristic, and its true nature would be at once obvious to any one who had any knowledge of its symptoms; but in the earlier stages there is but little to guide us to a diagnosis unless we have some hereditary history. Of the hereditary nature of this affection the published cases give ample proof. These are, firstly, the four cases (brothers), of Dr. Meryon, two cases (brothers), quoted by Dr. Meryon, and a third, who had died previously and had not been examined; two other cases, also quoted by Meryon ('Med. Chir. Trans., vol. xxxv, pp. 80-81), one of which is reported by Mr. Partridge ('Med. Gazette,' November, 1847), four cases in the same family, reported by Heller ('Deutsches Archiv Klin. Med.,' tom. i, pp. 616-629, 1865); three cases in same family by Seidel ('Centralblatt,' 1867, p. 666), and in several other cases the history shows that deaths have occurred in other children, who have had paralysis, which from the accounts given by the relatives was probably of this nature. Mr. Kesteven also gives the cases of two brothers, in the 'Journal of Mental Science,' vol. xvi, p. 41, 1871; Davidson, in 'Glasgow Med. Journal,' 1871, three cases, and many others. These children are at birth apparently strong and healthy, and it is not until they arrive at the age of twelve or fourteen months that anything is noticed. At that period it is found that when they are placed upon their feet they fall down, or clutch at the nearest object to support themselves; or in other cases it may be that the child has commenced to walk, when without pain or fever, or sometimes after convulsions, it is found to be soon fatigued, either by walking or standing, and at length it can no longer walk or hold itself upright; or again, it may be that the child does not walk until very late, 2½ or 3 years, and then very feebly and imperfectly. In one of my own cases the child did not begin to walk until 2 years old, and then but very badly, and would hold on by the chairs or any object within reach, and in another it had never walked well, but, as the mother said, "always walked wide and so dropped down."

These defects in movement do not excite so much attention among the class from which hospital cases are usually taken, as the limbs are apparently well developed, and they are constantly hoping to see the child recover from what they imagine to be a temporary infirmity. When the child so falls, it raises itself by the aid of the nearest article of furniture or other object that it can reach, or if none be within reach then in a very peculiar and characteristic manner. When the body falls forward these children apply their hands successively to the legs and thighs and so as it were push the body upwards, and when attempting to mount the stairs they drag the body upwards by the arms. The mode of progression is by a waddling, "duck-like" movement ("dandinement"), alternate balancing of the body on the leg which is applied to the ground. The equilibrium is always unstable both when walking or standing, and a slight force will cause the patient to fall "all of a heap;" in the case reported by Dr. Foster (loc. cit.) the boy had to be removed from school because the other boys would push him over, in order to see "his grotesque and futile efforts to raise himself." In the efforts to walk or in standing alone the feet are widely separated.

"It is true," says Duchenne, "that lateral balancings of the trunk are observed also in the child who begins to walk normally, but they are not very manifest and soon disappear, whereas in the disease I describe they increased and continued during the disease. I have never seen this symptom in children attacked with other paralyses, and look upon it as one of the principal characteristics of the pseudo-hypertrophic paralysis." This peculiar gait and station he attributes to feebleness of the middle and small gluteii ("fessiers"). As the case advances it is found that the child has a difficulty in bringing the heels to the ground; there is a condition of talipes equinus or equino-varus, and the toes are in a state of exaggerated extension upon the metatarsal bones; this condition of course increases the difficulty and peculiarity of gait. Before this latter condition becomes very marked, another and more striking characteristic becomes developed, in the form of a peculiar curvature of the spine, so that the shoulders and upper portion of the vertebral column, are carried backwards until a plumbline, falling from the most prominent of the spinous processes falls quite clear of the sacrum. This produces a deep curvature in the lumbar sacral region, a condition which Duchenne calls "ensellure," or, in English, saddle-back, and is due, he thinks, to weakness of the extensors of the spine, and is one of the most constant symptoms of the disease in question. In his monograph he gives plates contrasting this condition with that of the curvature produced by unopposed action of the spinal muscles, as in paralysis of the abdominal walls, where the curvature is at first glance somewhat similar, but the plumbline falls well within the line of the sacrum. (In the plates which accompany this the children are not standing alone, and therefore this is not so perceptible as it would otherwise be.)

The next symptom to appear is the one which is at once the great distinction and marked peculiarity of this affection—the apparent hypertrophy of the muscles. Its appearance is very gradual, but when the cases have advanced to the full development, the little patient may, as one of the cases pictured by Duchenne does, present the appearance of an infant Hercules. In most cases the calves and the buttocks are the chief seats of its manifestation, but in some, notably in the one just mentioned, it may affect other muscles. Says Duchenne speaking of this case, "With the exception of the pectorals, of the great dorsal, and of the sterno-mastoids, it had invaded all the muscles of the limbs, of the trunk, and even those of the face, especially the temporals" (see figs. 3, 4, 11, 'Archives Gén. de Méd.,' 1868). The muscles stand out so prominently under the skin that Duchenne uses the term "hernial protrusion" to describe their appearance. There is nothing more astonishing upon first sight than this curious contrast between the exaggerated appearance of muscular strength and the marked feebleness which is the reality. The unaffected muscles are usually meagre and feeble, but the degree of impairment does not always coincide with that of enlargement; nor does every enfeebled muscle increase in volume. "I have seen," says Duchenne, "subjects in whom the feebleness of the muscles was more or less generalised, almost from the commencement, but where the hypertrophy was limited to the muscles of the buttocks and the lumbo-spinals." This condition of apparent hypertrophy continues generally for a much longer period than the group of symptoms previously narrated; and it forms the second, or stationary period of Duchenne, which continues advancing very gradually, and almost imperceptibly, during two or three years, sometimes more (see Duchenne, 'Electrisation Localisée,' 3rd ed., p. 606, Paris, 1872). It does not necessarily begin first in the lower extremities, though it generally does so, and extends gradually from these to others, and becomes localised in certain among a number of equally enfeebled muscles. "In one of my observations," says our author, "the deltoids had commenced to augment in volume many months before the gastrocnemii" (loc. cit. supra).

The people in charge of the patient in this stage, whether parents or nurses, are deceived by the false appearance of good development; and although they see the weakness and failure of muscular power, hope constantly for improvement—a hope which is seldom dissipated until the case enters after a more or less protracted period, upon the third and last stage of the disease.

In the preceding period there has been but little, if any, extension of the paralysis; the progress has been marked rather by increase in the volume of the affected muscles, than by changes in innervation. But this is now no longer so; the enfeeblement of the lower limbs increases, until the patients can no longer carry themselves upright; the upper limbs become paralysed, "à leur tour, en masse;" and unlike those attacked in the earlier stages, they do not increase in size; on the contrary, both these and those previously enlarged now rapidly diminish, and some of them become atrophied. Elevation of the arms becomes impossible, and the affected muscles lose gradually all that remains of motility, until the poor child, then generally arrived at adolescence, can only remain seated or recumbent. This condition may last for a considerable time. "Pseudo-hypertrophic paralysis," continues Dnchenne, "is an apyretic malady in which the functions which preside over digestion, respiration, and circulation, are accomplished normally. The little patients may live a long time yet; at last they fall into a condition of great weakness, and are rapidly carried off by some intercurrent malady."

The disease is almost, but not entirely confined to infancy, and is more common in boys than girls. Dr. Webber ('Boston U. S. A. Medical and Surgical Journal,' November 17th, 1870) gives a table of forty-one cases, from which it appears that in one case the patient was twenty-six when the disease began, in one twenty-eight, and in one some few years under forty. "It is possible," says Hammond, referring to the above cases, "that those cases occurring in persons of adult age were instances of the simple hypertrophy of an extremity such as the case reported by Mr. Maunder ('Medical Times and Gazette,' March 27th, 1862), and similar ones by other authors."

Of the forty-one cases collected by Webber only five were females.

Of twelve of Duchenne's ten were boys ('Archives Gén. de Méd.,' 1868, p. 572).

Such is a very brief account of the symptoms and progress of this curious disease as given by its discoverer and historian.

The cases which have fallen under my own notice are as yet in the early stage, the muscular hypertrophy not being fully developed, but the other points are sufficiently well marked to assure their classification, to render their study and observation interesting. Upon referring to my note-books I find records of two cases which occurred in the out-patient practice of the Children's Hospital under my care in the year 1867-8, which were evidently cases of this nature, but I was not at that time sufficiently acquainted with Duchenne's opinions to recognise their exact species, and they were classed as examples of Cruveilhier's paralysis.

Though the peculiar enlargement of the calves and the widening of the legs was noticed, and in both cases, walking had been very late, and there was some mental weakness (in one retarded and imperfect speech). These cases, however, not being recognised, were not sufficiently watched, nor were the points to which attention was directed such as to make them in themselves of much value as reports, and I therefore only mention them in parenthesis and pass on to those which I have observed since that time, and which are still under observation.

Thomas C—, æt. 6, was brought to the Dispensary of the General Hospital for Sick Children, in this City, on the morning of July 2nd, 1874. Is a healthy-looking boy, good figure for his age, and the child of a healthy-looking mother, who brought him, and of whose father I could get no history of illness. He is one of twins, the other dying when three days old, and this one had convulsions at the same time, but has never had one since. He did not attempt to walk until he was two years old, and then but very feebly, holding by the chairs and walking upon the outside of his feet (especially the left). He has had measles, and since then the mother has noticed that he gets worse, and that the right leg, which was better than the other, is now becoming more affected. He was late in speaking, and the hearing is dull; but the mother thinks that this is only a recent symptom. When the child is stripped he appears to be a healthy, muscular, well-developed boy, with altogether an appearance of strength at variance with the feebleness of his movements. There is a marked exaggeration of muscular development in some regions, which is particularly remarkable in the calves, and more especially in the calf of the left leg, and there is marked hollowness in the lumbar region (saddle-back). The toes are in a condition of over extension, and there is a corn on the head of the metatarsal bone of the little toe on the right. The skin of the calf has a bluish-mottled appearance, and the muscles feel very hard and project as it were beneath the skin as though the integument were thinner than usual. When he attempts to walk he places the feet far, far apart, and rolls as it were from side to side, but as the heels are not brought down to the ground it gives him a dancing, tottering motion on the toes, and he grasps the first support he can reach. The reaction to Faradaic currents seemed unaltered, and the same may be said of the continuous currents. Of the temperature of affected muscles I can only say that it differed little, if at all, from the normal, and that any difference there might be was not in the direction of increase; but I was not satisfied with the results obtained, either with the ordinary clinical thermometer or one which I procured from Hawksley, made after a model described by Ord in his paper ('Med.-Chir. Trans.,' vol. lvii, 1874).

I am at present waiting the arrival of a thermo-electric apparatus in order to make further and more accurate observations.

Elizabeth S—, æt. 3, was brought under my notice at the Dispensary of the Children's Hospital on the 25th of March in the present year. There was nothing in the family history worthy of note; the parents were healthy, so far as could be gathered from the mother, and the other children, two in number, were quite healthy.

This child did not begin to speak until she was past two years old; about this time she had an attack of measles followed by hooping-cough, and has seemed to become gradually worse in her walking ever since.

About six months ago the mother noticed that the child's back was very much curved (saddle-back); and at the same time that she would not stoop down and had great difficulty in rising again if she was induced to stoop to pick anything up, or she was placed on the floor; this has continued and increased somewhat until the present time. She has always been a stupid, obstinate child, and gets more so, according to the mother.

The present condition is as follows:—A moderately plump, little girl, with a sullen expression of countenance, who walks with a tottering, waddling gait from chair to chair, and when seated on the ground will crawl to the nearest object and pull herself up by her arms with apparently but little assistance from the lower limbs. She talks very slowly, much more imperfectly than children of her age usually do. The limbs are all well developed, the lower limbs apparently more so than the upper. She measures round buttocks, over the trocanters majores, twenty inches, over the shoulders (centre of deltoid) twenty-one and a half inches. It is extremely difficult to get her to stand alone; when she does so she places her feet widely apart, and when she walks sways from side to side as she plants first one foot and then the other on the ground, and the separation of the feet is then even more marked than when standing. The heels do not quite touch the ground when walking.

Circumference of calf 2 in. below patella; right, 7¼; left, 7¼.
" thigh, middle, 9 in.
Temperature of calf, May 31st, 1875, 89·55°.
" " June 14th, 89⅜°, exposed twenty minutes.
" " August 16th, 87⅛°.
" thigh, August 16th, 90°, exposed ten minutes.

These temperatures will serve to show how unreliable is this mode of taking the temperature of distant parts, though I am inclined to believe that the temperature of the affected limbs does really vary considerably in this disease.

These cases do not present the marked appearance of exaggeration of muscularity which is seen in the later stages, but they are sufficiently characteristic, and if we test them by the marks upon which, according to Duchenne, diagnosis must rest, we shall find them to conform.

In some cases, no doubt, as in the case of the boy Gruard, whose figure illustrates Duchenne's works, almost the whole of the muscles seem to be hypertrophied, and the figure resembles the sculpture known as the Farnese Hercules; but these are but exceptional cases, and it is more common to find one or two sets of muscles, notably those of the calves and buttocks enlarged; and although the enlargement in these cases is not as yet so distinctly marked as in some of those reported by earlier observers, I have no hesitation in classing them with those as examples of the same disease. Let us examine briefly the diagnostic marks which characterise this form of paralysis, and distinguish it from its congeners—infantile paralysis (the spinale Kinderlähmung of Heine, or the "paralysie atrophique de l'enfance" of Duchenne, wrongly styled essential paralysis), and progressive muscular atrophy in the infant (Cruvelhier's atrophy, the wasting palsy of Dr. Roberts).

I will condense Duchenne's remarks on this part of the subject.

1st. *Wasting palsy* (to use Dr. Roberts' well-known name for this disease) in children, commences about the age of five to seven years in the face, where certain muscles, principally the orbiculars of the lips and the zygomatici, become atrophied. After a stationary period of some years (two or three), it invades the limbs and the trunk, progressing in the same manner as in the adult, *i. e.*, downwards, attacking first the muscles of the upper limbs, and of the trunk, and not extending to the lower limbs until a more advanced period.

Paralysis, pseudo-hypertrophic, begins in general by enfeeblement of the movements of the inferior members, and advances upwards in its progress, and does not affect the upper limbs or the face, (the muscles of which principally affected are the temporals and masseters), until an advanced period.

2nd. In wasting palsy the muscles, atrophy partially, irregularly, one after another, and the consequent enfeeblement does not involve any, but the movements proper to the atrophied muscles, and is in direct proportion to the degree of atrophy; with the result of abolishing numerous partial movements, and during muscular repose, of producing various deformities in the attitudes of the limbs and of the trunk.

In the pseudo-hypertrophic paralysis the muscular enfeeblement attacks at once, and simultaneously, all the motor muscles of a great number of articulations; at a more advanced period certain of these enfeebled muscles, or more rarely all the paralysed muscles, increase in volume to an exaggerated degree.

3rd. The contrast between the microscopic changes in the muscular fibres will be treated later on.

4th. In wasting palsy the muscular movements are not abolished until the muscular tissue itself has become altered, but in the pseudo-hypertrophic paralysis the movements are enfeebled or even abolished, although the primitive fibres have in general preserved their striation, which has only become finer (see Plate, fig. 2). When compared with the infantile paralysis (by which term I mean the atrophic paralysis of Duchenne, the so-called essential paralysis of infancy), the distinction is equally marked.

Infantile paralysis begins with fever in the great majority of cases, is sometimes generalised, sometimes paraplegic, sometimes hemiplegic or crossed, sometimes limited to one limb or a portion of a limb; all the muscles are paralysed at once and completely. Those which are least injured in the innervation ere long recover their motility, whilst the others atrophy considerably or are altered in different degrees in their texture.

The pseudo-hypertrophic paralysis appears at the present time to be apyretic in all its periods. At the commencement it affects the movements of the lower limbs and of the extensors of the spine. Then the movements are only enfeebled, and in the last period they are completely abolished.

In infantile paralysis in the first period the electro-muscular contractility is enfeebled, even though the muscular tissue is as yet intact.

In pseudo-hypertrophie the electro-muscular contractility is normal.

In an advanced period of infantile paralysis, the loss of movement is quickly followed by atrophy of the muscles more or less rapid, more or less profound, with alteration of the tissue of their fibres, proportional to the degree of the nervous lesion.

In pseudo-hypertrophic paralysis, the enfeeblement of movement is soon followed by augmentation of the volume of a more or less great number of muscles, without destruction of their fibres.

The microscopic distinctions will be treated further on.

But, it may be said, may not these symptoms be due to an arrest of development, of the co-ordinating faculty which presides over the equilibrium, and instinctive movements of walking or from some cerebral lesion? But here, again, although in many points these causes would simulate the early signs of the disease of which we now treat, yet our author points out very clearly the distinguishing marks. In the first case, when the child begins to walk, there is (except just at first a little widening of the legs, which soon disappears) neither widening of the legs nor saddling (ensellure), nor waddling in the gait. In the second there are the marks of cerebral mischief, defective intelligence, late speaking, and often difficult for a long time; in general dribbling of the saliva, and when the lesion is very severe, the voluntary movements of the lower limbs provoke reflex contractions.

Many of these symptoms have been recorded as appearing in cases of pseudo-hypertrophic paralysis, but the condition of the muscles and the progress of the case have in these cases shown the true nature of the disease. There is a possibility of confounding the early symptoms of spinal curvature from caries of the vertebræ, or even the exaggeration of polysarcie, but it is scarcely a probable mistake, and the feebleness of the movements of the lower limbs, and the difficulty in rising from the seated or recumbent posture, though it might mislead at first sight, would upon careful examination reveal its true cause.

In fact, I may say of the cases I have related, as Duchenne says of many of his own cases, that " although the muscles of the calves and of the lumbar spinal region were only a little more developed than in a normal state, I have not hesitated to include them in this morbid species, because they have presented the 'ensemble' of the other symptoms which concur to constitute it (progressive enfeebling of the lower limbs, saddle-back, lateral balancings of the trunk during walking)."

The degree of paralysis is not in any direct relation to the amount of apparent hypertrophy.

The symptoms described having been, when Duchenne first publicly described this disease (1861) in all the cases which he had seen, associated with certain cerebral functional troubles, viz. some obtuseness of intelligence, late-speaking, and sometimes a condition approaching closely to idiocy, he believed himself at that time, justified in attributing the disease principally to a morbid condition of the encephalon, but further experience having shown him that in a certain number of cases no morbid cerebral phenomena have been seen, he has now abandoned that hypothesis. Nevertheless, in a very large number of cases, there is distinct evidence of impairment of the intellectual faculties, and where the alteration does not go so far as this, there is generally to be found some peculiarity of temper, some stubbornness or other symptom, pointing towards a deviation from the normal condition of brain function in a perfectly healthy child. This is particularly well marked in the child's, and it has been noticed by most observers of late cases, especially by Langdon Down and Kesteven, and in connection with this part of the subject we should note the distinctly hereditary character of a great number of the recorded cases, and the probability that several others had been preceded in the same families by others of the same nature.

The evidence as to the electro-muscular contractility is somewhat contradictory, but seems to point to a condition little, if at all, removed from the normal in the earlier stages, though becoming in the later, as the disease progresses, more and more profoundly affected. The colour of the skin would seem, from the cases reported, to vary in much the same manner, and probably this will be found to be darkened as the disease progresses, and the nervous lesion (whatever it may be) affects the nutrition of the neighbouring tissues.

Of the temperature we might say almost the same, but in a case published by Dr. W. M. Ord ('Med.-Chir. Trans.,' vol. lvii, 1874) of a boy of seven, under the care of Dr. Bristowe, at St. Thomas's Hospital, the temperature of the hypertrophied muscles of the calves was found to be from 1·8° to 3·9° Fahrenheit higher than the muscles of the corresponding thighs, viz.—Right thigh, 83° F.; right calf, 85·6° F.; left thigh, 83·6°; left calf, 85·6° F.

The observations were repeated upon three separate occasions with a similar result. This result differs from that obtained by other observers in other cases, and also from that in my own cases. Indeed, in the case of the girl the result was exactly reversed, but, as I have remarked before, I believe the condition to be variable.

It is worthy of remark that during the course of this paralysis, the patients do not complain of any suffering; there is no alteration of sensibility of the paralysed part, neither hyperæsthesia nor anæsthesia, cutaneous or deep, and that the functions of the bladder and rectum remain intact. In short, the general health is well preserved during many years, and is little altered until near the last period of the disease.

The anatomical condition of the muscles.—The first examination into the state of the muscles in this disease, upon the living subject was made by MM. Greisinger and Billroth ('Archiv für Heilkunde,' 1865), while Duchenne was awaiting the opportunity of making this examination upon the dead body. The Germans having, as he says, "either less patience or more boldness," in the person of an eminent pathologist, M. Greisinger, excised a portion of the left deltoid, hypertrophied and completely paralysed, in a young living subject." The operation was performed by M. Billroth, who proceeded to make a microscopic examination of the portion of muscle removed. "We remarked," says M. Greisinger, "that the deltoid presented a yellowish-white colour, and that it did not contract upon contact with the bistoury. The excised fragment resembled exactly in most points one of adipose tissue. Upon microscopic examination, nevertheless, one saw the muscular faisceaux (bundles) in a state of complete integrity separated the one from the other by an enormous quantity of adipose tissue, so much that in one transverse section this tissue occuped six or eight times more space than the striated faisceaux." These fibres (the muscular) were normal in appearance and not increased in number, nor did they present any symptom of fatty degeneration.

A second case of the kind was reported by M. Wernich ('Deutsches Archiv für Klin. Med.,' 1864, tome ii, pp. 232—241), a third by M. H. Heller ('Deutsches Archiv für Klin. Med.,' 1865, tome i, pp. 616—629), and a fourth by MM. Eulenberg and Cohnheim ('Verhandl. d. Berliner Med. Ges.'; i, pp. 101—205). These latter say, "The volume of the fibres in the parts attacked has undergone notable changes, being diminished to a fifth or a sixth part of the normal. In the muscles of the upper limbs we found, moreover, masses which we regarded as the sheaths of empty sarcolemmæ."

The muscles were profoundly altered and presented to the touch the sensation of a pasty mass, non-elastic, and were traversed by yellowish striæ of a whitish-yellow tissue, showed everywhere a greasy reflection when cut. The electro-contractility was normal, and nothing was noticed in the nervous or vascular system differing from the normal. The patient was a boy of thirteen years. Duchenne himself denies that the surrounding fibroid interstitial tissue is composed of empty sarcolemmæ ('Electrisation Localiseé,' Paris, 1872, 3rd ed., p. 604), and in my own case there were certainly no such appearances.

The waxy fibres which surround the muscular fibres, and which contain a considerable quantity of ordinary adipose tissue (not oil-globules, but fat-cells), he looks upon as an increase of the ordinary connective tissue of the part, due to changes in the nutritive force, but the appearances are perhaps best given in his own words; he says ('Electrisation Localisée,' 3rd ed., p. 603)—

"1. The hyperplasia of the interstitial connective tissue, with production of a more or less abundant fibroid tissue, is the fundamental anatomical lesion in pseudo-hypertrophic paralysis.

"2. It has its seat in all the paralysed muscles as soon as they commence to increase in volume, and this it is which justifies the anatomical denomination of myo-sclerosic paralysis, which I have proposed to give to it, and, with regard to its symptomatologic denomination, the pseudo-hypertrophic paralysis."

"3. This it is which produces the considerable augmentation of volume of the muscles, by reason direct of the increased (hyperplasié) quantity of interstitial fibroid and connective tissue."

"4. The increased (hyperplasié) connective and fibroid tissue is ordinarily mixed, or united to a small or mean quantity of adipose vesicles; indeed (ou bien), according to the facts observed in Germany, it is replaced by a considerable quantity of these adipose vesicles. This last condition appears to me to be the most advanced degree of the interstitial muscular tissue in the pseudo-hypertrophic paralysis."

"5. From my personal observations the transverse striation is preserved in all the length of the most part of the muscular fibres, but it becomes extremely fine and very little apparent (see fig. 2). In the parts where the transverse striation has disappeared, we see the longitudinal striæ; some of these longitudinal striæ are themselves effaced, the sarcolemmæ seem to contain adipose vesicles, which, in reality, proceed from the surrounding interstitial tissue, and which, moreover, differ from the characteristic fatty granulations of fatty muscular degeneration."

"6. The hyperplasia of the interstitial connective tissue does not appear in general until the second period of the malady; it seems to me, to be preceded by an inflammatory state of the muscles, which may also occasion a slight augmentation of their volume. In this period (first period of the disease) the transverse striation is often of an extreme tenuity."

Dr. Lockhart Clarke is of opinion ('Path. Soc. Trans.,' vol. xix, p. 10) that "the oil-globules which are found are from the rupture of fat-cells, for they are not incorporated with the muscular fibre, as in fatty degeneration." The example of obtaining specimens of the affected muscles during life was not lost upon Duchenne, but he, with not less wisdom than humanity, availed himself of less barbarous, and more scientific methods than those of MM. Billroth and Greisinger (which were the subject of some severe criticism in a paper published by M. Fritz. 'Remarques sur la paralysies, avec surcharge graisseuse interstitielle (hypertrophie apparente) des muscles' ('Gazette Heb. de Méd. et de Chir.,' Paris, 1865). Taking his idea from an instrument, the harpoon or hook of Mideldorpf, he had a small instrument made by which he was enabled to obtain minute portions of muscular structure from the living; this he called his "emporte pièce histologique." It consists of a stem fixed to a handle and containing close to its pointed extremity a small cavity, over which slides a second portion, with a sharp edge which is moved by a button in the handle; it is plunged into the substance of the muscle closed, and upon withdrawing the moveable portion a fragment of muscular structure projects into the cavity and is cut off by the reclosure of the instrument; the wound made is said to be rather large, and in my own cases I have used a modification of the instrument which has answered very well, and which was proposed by Ord ('Med. Chir. Trans.,' vol. lvii, 1874); it consists of a pointed canula of small size, carrying, instead of the ordinary trocar, a sharp-edged screw, which projects about one eighth of an inch below the point of the canula, and in consequence of the obliquity of its extremity is in contact with about a quarter of an inch of muscular fibre; a few rotations of the screw will obtain all that is necessary for examination, the pain is very trifling, and the wound heals kindly. The instrument is made by Hawksley, of London. The fibres represented in the figure are from the gastrocnemius of the little girl shown in the cut; those obtained from the boy presented an almost exactly similar appearance, and between the fibres were adipose tissue and waved fibres of connective tissue. The oil-globules visible were not like those of fatty degeneration; they are large and are outside the muscular fibres, and result from the breaking up of adipose cells.

If we compare the fibres represented in the plate,* fig. 2, with the normal fibres represented in fig. 1, we at once notice the fineness of the striation; in some fibres this had almost disappeared, and the longitudinal fibres were visible, and if this be compared with the fibre represented in fig. 3, which was obtained from a case in an advanced condition of infantile paralysis, where the fibres are seen to have undergone a granular or fatty degeneration, and the interstitial tissue a fatty substitution (Duchenne, 'Archives Gén. de Médecine,' 1868, p. 566). In the wasting palsy of children in its later stages the fibres undergo somewhat similar changes to those which result in the infantile paralysis (by which I mean the atrophic spinal paralysis of Duchenne), the so-called "essential paralysis."

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* Although the plate gives a fairly accurate representation of the appearances, yet the transverse striæ shown in fig. 2 were in reality much closer together than the lines of the lithograph.

Pathological condition of the nerve-centres.—Probably the first case on record, in which the nervous centres were examined microscopically after death from the disease, was a case published by Stanley, before the Med.-Chir. Society of London, and reported in the 'Medical Gazette' for February 7th, 1840, in which it is stated that there was paralysis of the lower limbs so far as motor power was concerned, but no affection of sensibility; yet the anterior columns of the cord were unaffected, and the posterior only found to be affected. The reasons for believing this to have been a case of pseudo-hypertrophic paralysis will appear later on after a consideration of the lesions which further and more elaborate researches have found and described. But if we leave this case out of consideration as at least doubtful, we shall find in the report by Partridge, 'Medical Gazette' for November, 1847, a report of the examination of the brain and cord, in a case which we cannot doubt to have been really a case of the disease of which we are treating. The general symptoms, and muscular appearances have been previously narrated, and it now remains merely to recapitulate the appearances as described by the observer in the great nervous centres.

"On post-mortem examination the spinal canal was found to contain half an ounce of fluid, the cord being healthy. On opening the cranium a plate of bone corresponding to the squamous plate of the right temporal bone was found between the dura mater and the parietal arachnoid, the latter being thickened and opaque, the portion of brain beneath the plate of bone being depressed slightly." In other respects all seemed healthy.

Next follow Meryon's cases, 1850 (published in 1852).

"On examining the head the dura mater was found a little more firmly adherent to the cranium than usual; the veins of the surface of the brain, and those of the velum as well as the sinuses were gorged with blood, the sinuses containing a very loose coagulum. There was about an ounce of serum in the ventricles, and *with these slight exceptions the brain was perfectly healthy.*"

The veins and sinuses of the spinal canal were turgid with blood, more particularly in the dorsal region, *but the spinal cord itself* and the membranes were perfectly sound and natural in appearance. About from three to four ounces of serum existed in the spinal canal.

The next examination into the condition of the nerves and nervous centres in this disease, (and the first after its description by Duchenne,) was that made by MM. Eulenberg and Cohnheim, and published in 1866 ("Egebnisse der Anatomischen Untersuchung eines Falles von sogenannter Muskelhypertrophie," 'Verhandl. d. Berliner Med. Ges.'), but the results were negative, M. Cohnheim declaring that he found no microscopic alteration of the nerve-centres. "But," says Duchenne, "in spite of his great authority, one of the most distinguished of the former assistants of Professor Virchow, and to-day himself a celebrated master, it must be confirmed by new autopsies before this opinion of the pathological anatomy of nerve-centres in pseudo-hypertrophic paralysis can be permanently established."

The first case in which any definite changes were observed in the nerve-centres was, so far as I have been able to discover, a case related by Mr. Kesteven in the 'Journal of Mental Science,' vol. xvi (1871), p. 563. The subject was a boy of seventeen years of age, the elder of two brothers, victims of this disease. In this case there was considerable mental imbecility, increasing with the progress of the palsy; this patient died from pleuro-pneumonia in the last stage of the malady. The brain and entire spinal cord were removed and hardened in alcohol and chromic acid, and examined in sections transparent and opaque, and the following appearances were noted:—"The morbid conditions and change of structure are, in the first place, dilatation of the perivascular canals, consequent upon long-standing congestion, and in the next place, numerous circumscribed spots of granular degeneration of the nerve-substance. The dilatation of the perivascular canals is observable throughout the brain and spinal cord. It is so marked in many parts, that the vessels seem to lie in a tunnel cut out of the surrounding tissues. The vessels themselves are enlarged, and consequently being more readily seen, appear to be more numerous than usual. It would seem that from repeated distension of the vessels, occurring throughout long periods, the brain structure has lost its elasticity, and has yielded to the distending force; or, possibly, atrophy of the brain structure has caused it to shrink from the perivascular canals. This lesion of the circulation, originating in a morbid condition of the vaso-motor nerves, may have been the starting-point of subsequent structural changes."

"The spots of granular degeneration vary in size and in number in different parts. They are irregularly scattered in the white substance, adjoining the grey matter of the convolutions; very few are noticeable in the grey matter. In the corpus striatum, and thalamus opticus they are very sparse, and in the medulla oblongata, and spinal cord they are also few and far between. The form of these spots is generally circular; some few are lobulated. They are evidently spaces caused by loss of cerebral tissue, replaced by the morbid matter. Examined by a half-inch, or quarter-inch object glass this matter is seen to be amorphous, colourless, and semi-opaque; it resists the carmine dye, so that it is readily distinguished from the surrounding structure. In transparent and coloured sections the borders of the apertures are for the most part defined, their edges being formed by minute vessels and nerve-tubules, which become tinged by carmine."

"The borders, however, are frequently much less distinctly defined, the brain substance insensibly gliding into the granular matter. These spots of degeneration vary in size, the larger having a diameter of from $\frac{1}{50}$th to $\frac{1}{200}$th of an inch, while the smaller transparent spots range from $\frac{1}{250}$th to $\frac{1}{1500}$th of an inch in diameter. Throughout the brain and cord the cells of the grey matter retained their normal characters."

These remarks, it will be seen, refer to the brain rather than to the spinal cord, and in his last edition (Paris, 1872) Duchenne refers to the case of the boy Gruard, who died in February, 1871, and whose brain and spinal cord were examined both in the fresh state and hardened in chromic acid, and portions were forwarded to MM. Charcot, Vulpian, and Lockhart Clarke, and were found apparently sound, as were also the cerebro-spinal meninges.

The fullest and most complete examination with which I am acquainted is contained in the report of "A Case of Pseudo-Hypertrophic Muscular Paralysis," by T. Lockhart Clarke, M.D., and R. Gowers, M.D., published in the fifty-seventh volume of the 'Med.-Chir. Transactions,' 1874. The boy was 14 years old when he died, which was after much wasting and debility. His mind was quite unaffected, the sensibility unimpaired, and no affection of the sphincters. The post-mortem examination was made forty hours after death, and the lungs were found affected with lobular pneumonia.

The muscles were found to have wasted much in the latter stages of the disease. The gastrocnemii were pale in colour and greasy to the touch, and no trace of red tint could be seen in them; a section being examined "under the microscope, it consisted for the most part of distended fat-cells which lay between and widely separated bundles of muscular fibres."

In the deltoids similar changes were found.*

SPINAL CORD.—To external appearance normal.

Microscopic, on section hardened in chromic acid, from above downwards, at levels of second cervical glands.

"1. Disintegration in a greater or less degree of the lateral grey network which is so conspicuous in this region between the caput cornu posterioris and the *tractus intermedio-lateralis,* and through which the spinal accessory nerve makes its way into that tract. The tract itself was in a state of incipient disintegration, and on one side was in many sections traversed by a dilated and congested blood-vessel, around which the tissue had begun to suffer. The white columns were not perceptibly altered, but one lateral half of the anterior white commissure was entirely destroyed, and replaced by granular *débris,* by exudations, by extravasated blood-globules, which also filled the triangular space at the bottom of the anterior median fissure."

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* The above description may be compared with Duchenne's own words. He says (note to p. 614, 3rd edit., 'Electrisation Localisée'), "L'examen microscopique de ces pièces a montré l'altération musculaire ultime de la paralysie pseud-hypertrophique, c'est-à-dire des fibres musculaires moins larges qu'à l'état normal, dont la striation était en général conservée, quoique plus fine, et qui étaient séparées les unes des autres par une masse énorme de tissu adipeux melé de tissu fibroide et de fibrilles ondulées en petite quantité."

"2. On descending through the rest of the cervical region, the same kind of morbid changes, to a greater or less extent, were found at different levels, while the anterior and central grey substance on each side was the seat of extensive disintegrations. A similar lesion existed in some of the posterior nerve roots near their entrance into the caput cornu posterioris."

"3. Both lateral and posterior white columns were in many sections much damaged by sclerosis, consisting of a variable degree of disintegration of the myelin or white substance of the longitudinal fibres." "The anterior commissure extends very little beyond the median line at level of upper roots of sixth cervical nerves on the left side, the rest being completely destroyed." "In some sections of the cervical enlargement the posterior commissure was also a little damaged, while in others both commissures were uninjured." "In the triangular space at the bottom of the anterior median fissure a considerable extravasation of blood was very common."

"4. In the upper portion of the dorsal region the morbid changes were less frequent and extensive." "In the middle and lower portions of this region, however, the lesions were greater than in any other place. The lateral grey substance on the outer sides of the posterior vesicular columns, including the tractus intermedio-lateralis, was severely damaged by disintegration; while the anterior white commissure was, in many sections, wholly or partially destroyed. At the lowest part of this region, and the commencement of the lumbar enlargement, the lesions were most striking and extensive." "To the naked eye there appeared to be a cavity on each side, occupying the central part of the grey substance."

"5. In the middle and lower parts of the lumbar enlargement the lesions were less serious." "The anterior roots of the nerves were in many places injured by streaks of disintegration of variable size." "In the lower portion of the lumbar enlargement, and in the conus medullaris, the lesions of the grey substance were severer and more extensive. The central part of the anterior cornu and the outer part of the cervix cornu posterioris were much damaged by continuous disintegration. In some of the sections at the level of the upper sacral nerves, scarcely any large nerve-cells could be seen in the anterior cornu. Some of the nerve-cells were likewise atrophied and contained more pigment than natural."

These observations seem to support the opinion deduced by Duchenne, from a consideration of the muscular changes, that the changes produced in muscular nutrition by atrophy of the anterior cellules of the cord, differ so much from those seen in the pseudo-hypertrophic paralysis that the latter cannot be classed in the same category of morbid states. And I do not think that later researches have produced evidence at all incompatible with his opinion that "l'irritation formatrice qui produit la prolifération musculaire abondante, et les autres altérations du tissu connectif interstitiel des muscles, me parait être ici la cause probable de leur affaiblissement" ('Elect. Loc.,' éd. iii, 1872, p. 612).

Duchenne believes that the paralysis is due to a lesion of the vaso-motor system, and calls to witness the alterations of capillary circulation and temperature ("Refroidissement ou Elévation de la Température, &c.," 'Arch. Gén. de Méd.,' p. 570), though no lesion of the ganglionic system has been as yet demonstrated.

The prognosis in this form of paralysis varies with the stage. Duchenne states that he has seen two cases in the early stage cured by the use of localised faradisation, after the manner he has so long and so well taught. And I have believed myself that a slight improvement is visible in the condition of one of my two patients, but it is as yet too early to speak confidently. Dr. Hammond and other observers have had the same opinion, and the former was at the period of which he wrote (1871) trying the continuous current. The general opinion may be stated to be that in the first stage, before the muscles begin to enlarge, the prognosis, though grave, is not fatal; but that with the second period (that of enlargement) that hope leaves us; and still more is this so in the third or period of atrophy and debility.

The disease is rarely fatal in itself, the end comes from some intercurrent malady (pneumonia, &c.) to which the enfeebled frame readily succumbs in these advanced periods. It is on account of this hopeful condition of the early stages that Duchenne objects to the term "progressive" as applied to this disease, and simply calls it "paralysie myo-sclérosique (myo-sclerosis), not, as Requin and his followers would have done, *progressive* muscular sclerosis. And it is this which must make my apology, for occupying space in bringing before the notice of my brethren a disease which though rare, and such as may seem to some, only among the curiosities of practice, yet is probably much more common than our present knowledge would lead us to believe, and which does not present in its early and curable stage those striking features which become its characteristic in later stages. Nevertheless, we may venture to hope that further knowledge and experience will extend the period within which our art can be exercised with beneficial results, and even if that be not so, at least we shall be enabled to recognise the enemy before the defences have been lost.

The treatment includes the usual hygienic measures—baths, frictions, and shampooing, the iodides of iron, of potassium, strychnia, or nux vomica, and where there are cerebral symptoms the bromide of potassium has been found very useful. Tonics are indicated, arsenic, cod-liver oil, and Parrish's chemical food (the compound syrup of phosphates), have also been used with benefit, and probably free phosphorus in some of its therapeutic forms might be of value. But of all means within our power, the most promising is the prolonged and careful use of electricity in the forms of the induced and the galvanic current. I have myself used both forms on the same patient, and although both my patients, being out-patients, are rather irregular in their attendance, yet I believe that I can see some improvement. The instruments used are Stöhrer's batteries, and I have not used more than six cells of the constant battery, and his battery with one cell, for the induced current.

NOTE.—Since the above lines were written the great master upon whose researches they are founded has passed away, and I cannot refrain from placing upon his urn, my humble tribute to the great mind, the original thought, and the indomitable industry which have bequeathed to our profession so many valuable gifts of knowledge.

I must acknowledge my debt to the skill of J. Broadbent, Esq., surgeon of this city, for the microscopic sketches which illustrate this paper.

The writer alone is responsible for the accuracy of the translations and the general rendering of Duchenne's opinions.—W. H. B.

NON-UNION OF FRACTURES.

BY H. O. THOMAS, M.R.C.S., LIVERPOOL.

So many varied methods have been practised for the relief of ununited fractures that the addition of another seems almost superfluous.

The majority of the methods previously in use were attended with more or less risk in their application, and were all but impossible where the fractures were very close to or involved a joint; as for instance the non-union of a fractured condyle of femur, the head of the tibia involving the knee articulation, or tibia and fibula in the ankle.

A case of non-union of the latter character came under my care in March, 1874.

CASE 1.—The patient, Mr. John T—, of Southport, was admitted into my hospital on the 16th of March, suffering from fracture of lower end of fibula and tibia. In this case there was so much abnormal motion between the fractured bones, permitting outward luxation of the foot, that the internal malleolus of the tibia nearly came in contact with the ground when the patient placed the weight of his body on the limb, and the fracture threatened to become compound. The deformity was easily reduced, but recurred with the slightest weight of the body to this extreme degree.

As none of the usual methods could be applied in this case with any safety, I decided to try what effect a repeated application of percussion, with a rubber-protected mallet applied all round the articulation, would have.

I accordingly commenced the treatment on the 20th of March, and applied percussion every second or third day for four weeks, desisting only for a few days when the parts became irritable. There was applied no splint or appliance whatever. From the first day of the operation there was a daily increase of consolidation and stiffness of the part, which continued until it resulted in a complete bony union in the space of four weeks; and on the 24th of May the patient was dismissed from the hospital quite cured, and free from this defect, the lower end of the tibia and fibula being considerably enlarged.

In this case the non-union had existed for a period of twelve months.

This was the first instance in which I tried this method of treatment, but, finding it to answer beyond all my expectations, I decided to adopt it in future cases so as to give it a more extended trial.

Case 2.—On the 19th of March last I was consulted by one Harry B—, of 30, Gradwell Street. This patient was suffering from a fractured leg, with non-union after sixty-five days' treatment. Assisted by my friend Dr. William Kelly the patient was placed under æther, and the tibia percussed carefully for ten minutes, the skin being protected during the operation with a layer of felt. The percussion was in this case followed by a considerable amount of swelling and irritation. The limb was placed in a suitable appliance, and at the expiration of four weeks complete consolidation took place.

In this case percussion was only once performed.

Case 3.—On the 14th of May last I was consulted by John McA—, who was suffering from a fractured leg sustained on the 23rd of February, 1874, on board the Steamer "Caspian." He had been in the hospital at Halifax for eight weeks, and on his arrival in England, suffered from non-union, and consulted a specialist in this town, under whose care he remained for five months. At the end of that period he was for eight weeks a patient of one of the charities, and on the 14th of May last became an indoor patient in my hospital, when I performed percussion upon the tibia with the effect of consolidating the fracture in six weeks.

This was percussed only on one occasion.

Case 4.—On the 1st of January last I was consulted by James K—, a coloured man, who had his humerus fractured while steering one of the Dominion steamers in a storm. The patient was two weeks at sea before receiving any professional assistance. On his arrival at this port he consulted me, and the fracture was fixed in my usual appliance and continued in that condition for two months with only partial union. I noticed that while the union seemed complete on making a lateral strain, it seemed to be quite loose if strained antero-posteriorly, imitating a hinge-joint.

On the 28th of April I commenced to percuss the humerus, protecting the skin, and did so for four days, until there was a decided enlargement about the fracture. A rapid consolidation took place, which was complete in a mouth's time.

Case 5.—On the 15th of July last I was consulted by John McN—, who fractured his leg on the 13th of October, 1874. He was for ten weeks an indoor patient of a charity, and for fifteen weeks more an outdoor patient. I found on examination that there was non-union, and decided upon operating. Having administered æther, the limb of the patient was well percussed with a copper mallet, rubber-faced. During the operation the patient partially recovered from the æther, and getting possession of the mallet, was almost successful in applying it to the writer and his assistants. We succeeded, however, in disarming him, administered more æther, and finished the operation.

The operation not being followed by much periosteal irritation I repeated it every week for six weeks, but not under æther. The limb was retained in a suitable appliance for maintaining immobility, and on the 1st of September the limb was quite strong and well consolidated.

Case 6.—John Dark N—, on the 15th of June last, fell into ship's hold and fractured his thigh, and was admitted into a charity for treatment, where he remained seven weeks, at the expiration of this period became an outdoor patient for three weeks, and, judging that the limb was becoming weaker, consulted me, when I found, on examination, non-union of the femur. I operated by my percussive method for a period of five minutes, producing a considerable degree of irritation. On the first day, and on every fourth day for three occasions, repeated the application in a milder form. During this time and up to the occurrence of consolidation he was well fixed in a suitable appliance with a satisfactory result.

Case 7.—In January last I was consulted by Peter G—, who, while rescuing a fellow-workman from some machinery, had himself become entangled and suffered a compound fracture of the forearm (radius, and ulna). The limb was carefully placed in a suitable appliance for a compound fracture, and was not disturbed for three months, when, on examination, I found that the radius had not united. I continued the treatment for two months longer, when, finding that the radius was still ununited, I commenced to percuss the humerus, carefully supporting the ulna from refracture, and continued the operation every alternate day on twenty-five occasions with the effect of greatly enlarging the radius. The forearm became much stronger, with some amount of consolidation, but wanting in firmness; and, as the patient had excellent use of the arm, I did not advise further interference.

The failure of complete consolidation in this case arose from the fractured ends having become absorbed, and consequently wanting in length to come in absolute contact.

The cases in which I have practised the foregoing method, though not numerous, afford a fair test of its value, more especially the first case, in the treatment of which I did not anticipate any success.

During my professional career (in my own practice) I have frequently had delayed union, but only one case of non-union, that being the case *last* reported.

As to the cause of non-union, I am by no means satisfied that it arises from the want of skilful treatment or insufficient immobility, as I have frequently noticed cases that were thoroughly fixed and carefully watched delayed in union; while in another case, though receiving less attention possibly, a rapid union took place.

I have tried various methods; manipulation and friction to the ends of the fractured bones, and passing a tenotome between the ends of the bones but both of these methods are very unsatisfactory. I have also tried the method with bone, metal pegs, and screws, first having sawn the ends of the bones, using the screws or pegs with the intention of assisting immobility, and I am satisfied that the limb does better without the pegs than with them, having on frequent occasions operated without these accessories.

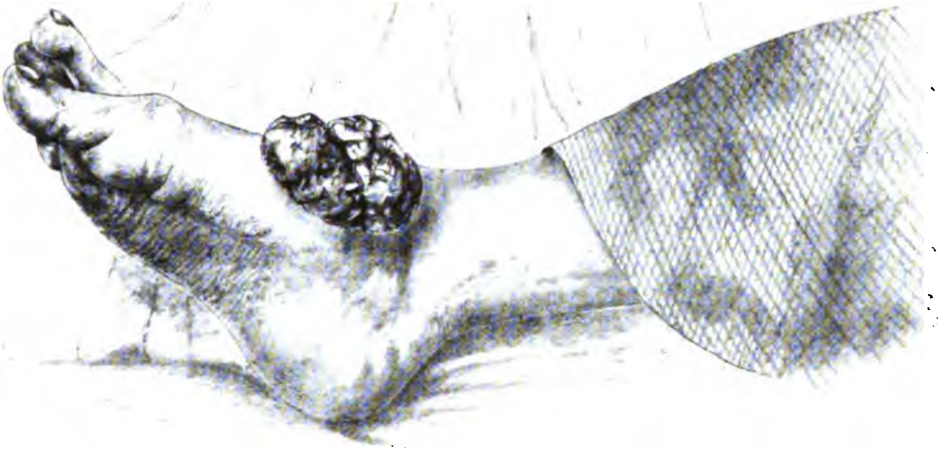
I have also operated on three occasions by a subcutaneous method, using an instrument which was chisel-shaped at the point, and file-cut on the rest of the blade, thus combining a knife and a rasp. This answered very well.

On one occasion also I operated upon a humerus where the bones were an inch short of being in apposition, and the limb had the appearance of an hourglass contraction at the part where the bone was deficient.

I operated upon this case by (what a ship-carpenter would call) "scarfing" the ends of the bones, with the result of a very excellent recovery.

Such a case as the latter would *not* be amenable to the treatment by percussion, but I am confident that the method of treatment by percussion will be found most useful for all ordinary cases of non-union, where the bones are in apposition and no interval of deficiency or any tissue exists between their ends.

Messrs. Khrone and Seseman, of London, supply a very neatly constructed copper-headed mallet which I designed for these operations.



CASE OF RECURRENT FIBROID TUMOUR.

By CHARLES W. THORP, F.R.C.S.I., L.K.Q.C.P.I., &c., Dobroyd, Todmorden.

Mary F—, æt. 39, old-looking for her age, fair complexioned. About ten years ago first perceived something wrong with her instep, which was painful, but nothing could be seen or felt. She consulted a surgeon, who strapped some wooden splints tightly over the affected part with plaster. Not having received any benefit, but swelling and redness of the part having set in, she went into Halifax Infirmary, where the part was blistered, and having derived relief therefrom she left ten days after admission.

A fortnight after the instep became swollen and inflamed. The skin broke, but closed in a few days. The lump, as she described it, gradually grew larger, and at at times felt painful. She then consulted an herbalist, under whose care she continued for about two years, until I first saw her in February, 1867. He had applied some ointment of a caustic nature, which caused a slough; after which the present growth appeared, and went on increasing until it assumed the appearance in photograph.

I then removed all the diseased mass, cutting well into the surrounding structures, but experienced considerable difficulty in getting away some parts which were embedded between the tendons. For about a month the wound healed by granulation, and she felt nothing more of it for a year, when pain began, at first slight, until 1870 (nearly three years since the excision) when it became unbearable. A hard tumour appeared in the same place as the last, having gradually grown to the size of a hen's egg, but no ulceration.

The skin covering it appearing healthy, I raised it as a flap in amputation and dissected out all parts of the tumour I could find, having to divide some tendons, so intricately had it ramified amongst them. The wound healed by the first intention, and she was apparently free from the disease until the beginning of 1871, just one year since the second operation. The growth appeared again subcutaneously, and increased rapidly, with pain recurring in paroxysms of so excruciating a character that during its presence she seemed almost to lose her reason. No narcotic appearing to relieve her except hydrate of chloral, and that only imperfectly, at her earnest solicitation I amputated by Syme's operation in March, 1871, after which she made a good and rapid recovery, and remains perfectly well up to the present time, October, 1875, being able to go about very well with only a slight limp by the aid of an artificial foot.

Remarks.—The growth before first excision presented exactly the appearance of fungus hæmatodes, and bled freely when touched. I sent the foot, after removal, to Dr. William Roberts, of Manchester, who examined the tumour microscopically, and pronounced it "recurrent fibroid disease."

NOTES ON PLACENTA PRÆVIA, WITH CASES.

By HUGH MILLER, M.D.,
SURGEON TO WIRRAL HOSPITAL FOR SICK CHILDREN, BIRKENHEAD.

The subject of placenta prævia is one which must ever enlist the sympathies of accoucheurs, and this cannot be wondered at when it is remembered how high the mortality is which is attendant on this unfortunate complication of the puerperal state. The responsibilities of the practitioner in its treatment are so great that it may well be questioned whether in the whole range of his professional life he is ever placed in a more anxious position. In no class of cases ought he to come with a more profound knowledge of the subject, and less blinded by traditional routine; in none should he more resolutely rely on his own individual judgment in applying the rules of treatment which the exigencies of each particular case may demand, for all the mere dogmas of books and schools will avail him but little in the trying emergency.

In glancing at the history of placenta prævia it is curious to note the differences of opinion which exist among obstetric authorities, as to who first really recognised and described this complication. While Dr. Lee,* in his "Historical Account of Uterine Hæmorrhage in the latter months of Pregnancy," would lead us to infer that both Guillemeau and Mauriceau were aware of its real nature, Dr. Barnes† maintains that it was not until the time of Levert and Rigby—more than a century later—that it was clearly understood. To Portal, Giffard, and Rœderer has also been ascribed the honour. The weight of evidence, however, appears to be in favour of the last mentioned, who in his 'Elementa Artis

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* 'Edin. Med. and Surg. Journal,' April, 1839.

† 'Lectures on Obstetric Operations.'

Obstetriciæ,'* clearly describes the cause of the hæmorrhage, and differentiates between lateral and central presentation. If priority of publication cannot be claimed for Rigby,† still the credit must be given him of having been the first among his countrymen lucidly to explain the whole subject and deduce rules for its treatment.

Our knowledge of the causes of placental presentation is purely theoretical. Normally it is attached to the left, or right side of the *fundus uteri*. Sometimes, however, it is found on the anterior or posterior walls, and more frequently on the middle portion, between the fundus and *os internum*. Various theories have been adduced to explain its attachment to the lower segment of the uterus. The most plausible, and that which seems to have been most generally accepted, might be called the mechanical one. The fertilised ovum which is ordinarily retained in the neighbourhood of the uterine orifice of the Fallopian tube by the plastic effusion of lymph, under some peculiar condition, or it may be absence of that lymph, gravitates to the lower part of the uterus, favoured, no doubt, by the greater receptive power of the mucous surface. Professor Leishman‡ explains how this may occur by saying that, "if its descent is, relatively to the menstrual period, later than is usual, it may find the mucous membrane no longer tumefied and convoluted to the same extent as before; and there can be no doubt that a smooth and flat surface would be more likely to permit of such gravitation than the other condition of the membranes already referred to as characteristic of a menstrual period."

It is not until the later months of gestation that symptoms of placenta prævia present themselves. The first and most important of these is hæmorrhage, which, though it may occur under other conditions, is sufficient to warm the practitioner that he may, and very probably will, have that complication to deal with. That the majority of floodings which happen before delivery arise from this unfortunate position of the placenta cannot be reasonably doubted. The period at which it may take place varies considerably in different cases. Its most frequent occurrence is during the last two months of pregnancy. Before that time it must be looked upon as of doubtful origin, and more likely to be accidental than unavoidable. Changes now take place in the neck of the uterus which result in the separation of the placenta, and consequently rupture of the vessels. When this is remembered it is not at all surprising that there should be attacks of flooding when the woman is at perfect rest; though, of course, it happens more commonly under more than usual excitement or exertion. The suspicious character of the hæmorrhage is the absence of pain, and should warn the practitioner that he must not on any account leave the woman until he has satisfied himself as to the true nature of the case; and for this reason an examination should be made which, if the parts be sufficiently dilated, will at once remove any doubt. The uneven surface of the placenta cannot be mistaken. No more verbal description can ever convey with precision the peculiar feeling which it imparts to the finger. A new method of diagnosis by means of stethoscopy has lately been introduced by Dr. Wallace, of Liverpool. It consists in passing a peculiarly formed stethoscope, per vaginam, until it reaches the os uteri and the upper vaginal part of the pelvic excavation. For a full account I beg to refer the reader to a paper published by Dr. Wallace himself in the 'Edinburgh Medical and Surgical Journal' for 1873. Being assistant with him at the time, I had every facility for watching the development of this plan of diagnosis, and believe that in many cases it will prove invaluable. Those in which it is most applicable are where the os has not been to any extent dilated. In such Dr. Wallace has been able, by bringing the stethoscope into contact with the cervical zone of the uterus, to say, not only that he had to deal with placental presentation, but has been able to differentiate as to its actual condition, whether centre for centre, or only partial; or that the placenta was not there at all, and therefore the hæmorrhage was accidental.

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* First published at Göttingen in 1753.

† Rigby, who has been much and deservedly eulogised for his "Essay on Uterine Hæmorrhage," did not publish it until 1775.

‡ 'System of Midwifery.'

In briefly considering the treatment of placenta prævia but little need be said of cases which occur before the seventh month, it being almost identical with that which obtains in abortion. Rest, and it may be plugging the vagina, are usually sufficient to stop the flooding, and allow the case to go to a later, or, perhaps, to the full period of gestation, and it is only then that the real question of treatment arises. Suppose, for example, a case at near the full time, where there has been great hæmorrhage, and where the os is somewhat dilated and dilatable. There is no pain, and a complete cessation of flooding. The woman is in a very exhausted condition, with a weak and irregular pulse. Shall we save the child, and at the same time afford the woman the best chance of recovery by hastening labour? Can she bear the shock of delivery in her present condition? Is there likely to be a more fitting opportunity than the present? These and such questions every man must ask himself, and according as he rightly grasps and clearly perceives their important issues will depend the success of his treatment. By forcibly dilating the os and turning, the woman is almost certain to succumb. She is likely to recover her exhausted energies if sufficient time be gained. Without at all dallying with so great a danger, I think we may wait and watch for that more fitting time for operative procedure. Meanwhile, hæmorrhage, if possible, ought to be prevented; and it is here that plugging becomes legitimate. Considerable difference of opinion exists as to the use of the plug, there being a tendency on the one hand to exaggerate its importance, and on the other to question its value. To consider it other than a temporary expedient would be giving it undue prominence, and to discard it altogether were equally injudicious. Its object is primarily to prevent hæmorrhage, and thus give the woman time to recover from her exhaustion. Various articles may be used in cases of emergency, such as sponges, strips of lint, cotton wool. If, while restraining the hæmorrhage, we desire the dilatation of the os, nothing will answer so well as Barnes's bags.

This method of temporising should never lead us, however, to rest on the false assurance that everything is safe. Internal hæmorrhage may come on insidiously, and this unseen contingency may deprive us of the last chance of saving our patient.

If flooding does occur, and cannot be stopped, there remains no alternative but to deliver as quickly as possible. Suppose, however, that the case goes on satisfactorily; how shall we deliver? There can be no doubt, after all has been adduced in favour of the different methods of treatment, that turning is the one most universally available. This practice, first introduced in such cases by Guillemeau,* and still more efficiently by Portal,† has stood the test of time, and, with a few distinguished exceptions, has been adopted by succeeding accoucheurs. The rules differ but little from those which guide us under ordinary circumstances. The difficulties are never so formidable, from the fact that the parts are much more relaxed, owing to loss of blood. It is not well to hurry in such cases. While the hand is in utero it acts as a plug, so that no hæmorrhage generally takes place. If it be possible to ascertain what side the placenta is least adherent, that part should be chosen for the passage of the hand, which then insinuate between the membranes and the wall of the uterus until a foot is reached. The membranes are now ruptured and a foot brought down. The case is now a natural one and may be treated as such. A dose of ergot may be given, and pressure applied to aid uterine contraction.

In the following case the question of delay might have been for a time discussed, yet ultimately, immediate delivery seemed the only alternative; and in adopting this I was glad to have the opinion of one of the most experienced accoucheurs in the neighbourhood, who kindly saw the case with me.

Mrs. S—, æt. 27, married four years. Had had one child at the full period of gestation. She had gone, as she thought, until within a fortnight of the full time with the second, when, on the 24th of December, 1872, she was seized, while whitewashing her kitchen, with a severe flooding. It soon passed off, however, and, unfortunately, not aware of the danger of her situation, she continued to perform her various duties as if nothing had happened, until four days after, when she had another attack of hæmorrhage. The midwife whom she had engaged was sent for, but refused to have anything to do with the case. Some two hours after I saw her and found her in a very exhausted condition. On examination the os proved to be about the size of a florin piece, and through it the placenta could be easily felt. Pains were still present, and there was slight hæmorrhage which had continued, I was informed, from the first. Both, however, stopped, and her condition seemed to improve while I remained with her. Not considering it judicious to do anything operative under the circumstances, I plugged the vagina, and left with the injunction that I was to be sent for at once if she was again taken ill. Some two hours after I was called to see her, and took the medical friend before mentioned with me. Severe pains had come on, and the os was now much more dilated, with the placenta protruding to a slight extent through it. Meanwhile but little hæmorrhage had taken place, and the woman's condition was not worse. After consultation it was determined that turning and immediate delivery should be adopted. The operation was more difficult than I had anticipated, owing to the rigid condition of the os. The ordinary method was followed of passing the hand between the placenta and uterine wall until the membranes were reached, when a foot was brought down. The uterus did not contract well, and considerable hæmorrhage followed, which was with difficulty restrained. The woman kept up very well during the operation, but soon after symptoms of sinking began to appear. Everything was done to revive and sustain the strength by the administration of stimulants, but without avail, as she died three hours after. The child lived and did very well.

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* Guillemeau adopted turning—the *accouchement forcé*, as it was called—in cases where there was great danger, and where it was necessary to hasten delivery; and in none, it can be well understood, was this operation of greater value than in cases of placenta prævia.

† Portal was the first to introduce the improvement of passing the hand between the membranes and the walls of the uterus before rupturing them.

To *post-partum* hæmorrhage, occurring in the already exhausted condition of the woman, must be attributed the unfortunate result of the case. But for this I believe she would have rallied and made a good recovery.

The method of treatment introduced by Dr. Barnes has received a good deal of attention in recent years. It is too well known to require more than a passing notice. He begins by dividing the uterus into three zones, which he names the fundal meridional, and cervical. The last of these is the region of dangerous placental attachment. It is there that we have placental detachment and hæmorrhage. "When," he says, "the dilatation of the cervix has reached that stage at which the head can pass, and all that part of the placenta which had been originally adherent within the cervical zone is detached; and if, as is the constant tendency of nature to effect, the intermitting active uterine contractions arrest the hæmorrhage, a stage is reached when the labour is freed from all prævial placental complication; the lateral portion of the placenta retains its connection, supporting the child's life; the labour is, in all respects, a natural labour.* Notwithstanding this, however, he recommends that the membranes be punctured, "in all cases of flooding sufficient to cause anxiety before labour;" for "it is the most generally efficacious remedy and can always be applied." It is only when this fails that he resorts to "separating all the placenta which adheres within the orificial zone." And only when both fail does he turn as a last alternative. The practice of puncturing the membranes is a very old one. It was done by Mauriceau for the same object that it is now. The distinctive features of Dr. Barnes' treatment, then, depend upon his theory as the cause of hæmorrhage in placenta prævia, and upon the view he takes of the process by which bleeding is checked in such cases as get well spontaneously. If we consider these somewhat arbitrary, we ought still to receive them with that deference which is due to one who has done so much to elucidate this particular department of obstetrics. His practice for the present can only be considered as tentative. A much more extended experience must necessarily follow before it can supersede the older and more widely adopted system of turning.

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* 'Lectures on Obstetric Operations.'

The following case bears to some extent on Dr. Barnes' plan of treatment:

On September 23, 1873, I was called in haste to see Mrs. H— on account of a severe flooding which she had had immediately before. On reaching the house I found that she had lost a great quantity of blood, and was in an exhausted condition. She was twenty-two years of age, a primipara, and judged that she had gone to quite the full period, though not sure. This was the third attack of hæmorrhage that had taken place—one twelve days before, when walking quickly upstairs, the other while lying perfectly still in bed, as in the case previously narrated. There was no further hæmorrhage after the first gush, and the pains, which had been pretty severe, soon passed off. On examination the os was found not much dilated and not very dilatable. I watched the case for some time, but did not find that it at all progressed. I therefore plugged the vagina with cotton wool and promised to return later on. Three hours after I saw her again in company with my friend Dr. Lambert. There had been slight pains in the interval, but not the least hæmorrhage, the plug having most effectually prevented this. The woman's condition had improved. The os was somewhat more dilated, but still we did not judge it well to do anything. While hæmorrhage was prevented and pains remained in abeyance there was no need for hastening labour. If sufficient time were gained we thought the woman would so far recover from her exhaustion as to bear the shock of delivery much better than in her present state. The plug was returned, and we left, giving instructions that we were to be called if pains or hæmorrhage came on again. Nothing further was heard of the case until the following morning, when we were sent for. By this time true labour pains had set in, and the os was well dilated and dilatable. It was now determined to deliver, and following Barnes's method so far, the placenta was detached from the cervical or dangerous zone. It may be here noted, as bearing out Dr. Barnes's theory, that after the detachment of the placenta no further hæmorrhage took place. The membranes were ruptured and the liquor amnii allowed to escape. A severe pain came on and brought the head well down The labour now went on in a most satisfactory manner, and ended in the expulsion of a living child. The mother, though a very delicate woman, made an excellent recovery.

The preceding case exemplifies what has already been said on the subject of treatment generally. In detaching the placenta from the cervical zone first, and afterwards rupturing the membranes, we simply did what was, in our judgment, best in the individual case.

The method of treatment advocated by the late Sir James Simpson, of complete separation, and if necessary extraction of the placenta before the child, has given rise to a great deal of discussion among obstetrical authorities. In introducing it he discarded the ordinarily accepted belief as to the origin of the hæmorrhage; or rather, to speak more correctly, adopted that which had been long before promulgated by Rawlins,* of Oxford; and more recently by his own predecessor Hamilton,† of Edinburgh. After describing the cavernous structure of the placenta, with its cell communication, so free as to permit the blood of one part to pass rapidly into other portions, he shows how the hæmorrhage may be greater when there is only slight detachment of its surface, than when the detachment is more extensive; how "the intensity," to use his own words, "of the resulting hæmorrhage will be regulated as much, or more, by the extent of placental surface which *still* remains in attachment to the mother, as by the extent of surface which is *already* detached; for the freedom with which the blood is supplied to the placenta will affect the violence of the flooding equally, or more so, than the freedom with which that blood is allowed to escape from the open orifices of its ruptured vessels."‡ As a proof of his theory, he cites the diagnostic difference between accidental and unavoidable flooding, namely, that in the first, the hæmorrhage is less during the pains and greater in the intervals, and in the second, less in the intervals and greater during the pains. He then further shows how the "hæmorrhage is immediately moderated or entirely arrested when the placenta is once thoroughly and perfectly separated from the interior of the uterus."

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* 'Dissertation on the Obstetric Forceps,' 1793.

† 'Practical Observations,' 1836.

‡ 'Obstetric Works,' vol. i.

The placenta, then, according to his theory, is the real and only source of danger, and ought to be either wholly detached, or, if necessary, extracted altogether. Noticing, what had already been reported by previous authors, that in many cases the placenta s spontaneously detached and expelled with perfect safety to both mother and child, he conceived the idea that this might be done artificially with equal success.

His theory of hæmorrhage, however, has been much opposed, and his plan of treatment, based upon that theory, not less so. Dr. Barnes has shown how formidable must be the complete detachment of the placenta, considering the extent of its surface; and even if the operation were less severe and more practicable than is generally supposed, the advantages to be derived are not such as to lead us to adopt it in preference to the other methods of delivery. Considered in relation to the child it does not appear promising. By removing the placenta the chance of saving the child is very slight. True, it might be if expelled immediately after the extraction of the placenta. But how can it be determined beforehand that this will be the case? The elaborate series of statistics which he has collated, however favorable they may appear at first, are all based on the false assumption that artificial extraction is similar to spontaneous expulsion of the placenta. But, as has been shown, the one differs very materially from the other. In spontaneous expulsion the uterus acts with great power, and so forcibly contracts as to prevent hæmorrhage, whereas in the other case the uterus will but insufficiently contract, and bleeding will be the result. His method, however, has never been much adopted unless in exceptional cases. Simpson himself, in his more recent writings, so far modified his views on the subject as to advocate the separation and extraction *only* in cases where "the other recognised modes of management were insufficient or unsafe, or altogether impossible of application."

Desperate cases will arise in the course of our professional lives where there is nothing left for us but immediate delivery as affording the last chance of saving the mother or child. When delivery has been effected, and when there is an appearance of collapse and sinking, the question of transfusion becomes a most important one. There can be no doubt that this is an operation in the highest degree beneficial in some of the most hopeless cases of exhaustion, and one moreover which ought to be performed much more frequently than it is.

I had the pleasure some time ago of seeing its marvellous effect in a case where it was performed by Mr. Alfred Higginson,* of Liverpool. As the patient was left in my charge for some hours after the operation, I shall not soon forget how she rallied, how the pulse became stronger and more regular, and the woman awoke from a short slumber much revived and considerably better. The case terminated in complete recovery, convincing me that transfusion is decidedly worthy of adoption in all cases of apparently hopeless exhaustion from loss of blood.

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* Given by him in the 'Liverpool Medical and Surgical Reports' for 1871. The case occurred in the practice of Dr. Wallace, of Liverpool, and though not one of placenta prævia, this does not affect the question of transfusion. It is fully recorded by Dr. Wallace in his paper on "The Differential Diagnosis of Accidental and Unavoidable Hæmorrhages, and the treatment of the latter," in the 'Liverpool and Manchester Med. and Surg. Reports,' 1875, p. 75.

HÆMORRHAGE FROM THE GENITAL ORGANS IN THE RECENTLY BORN FEMALE CHILD.

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THERE occurs now and then in the female infant a discharge from the genital organs which is more or less similar in character to the menstrual fluid, and which makes its appearance within a few days after birth, most commonly, indeed, within the first week. The duration of the flow is generally from two to five days, although occasionally it has been considerably longer, and the quantity, which is sufficient to cause a stain of some size upon the napkin, amounts altogether to what would be considered an ordinary menstrual flow proportioned to the child's tender age and diminutive size. On examining the external organs of generation they are generally found to present a normal appearance; sometimes the *labia pudendi* have been noticed to be a little swollen and red, and in one instance it is stated that the *clitoris* and *nymphæ* were excessively prominent (see table, No. 14). The discharge is seen issuing from the orifice of the vagina in the form of a slight oozing, and the flow not unfrequently terminates by the formation of a small clot. Vogel says, "The breasts often swell at the same time, and on moderate pressure will give exit to a few drops of milky fluid."* This only occurred, however, in one of the cases I have collected; and inasmuch as Vogel has only seen two cases himself, and gives no other authority for this statement, it is probable that he is in error in speaking of the occurrence of swelling of the breasts as *frequently* coincident with this hæmorrhage. In one other case in my table the *mammæ* became swollen (No. 16); this, however, did not occur simultaneously with the flow of blood from the genital organs, but five days afterwards.

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* Vogel (A.), 'A Practical Treatise on the Diseases of Children;' translated and edited by H. Raphael from the fourth German edition. New York: 1870, p. 471.

The absence of any recurrence of the phenomenon separates these cases from the recorded instances of precocious menstruation; in five only, out of the twenty-five cases, was any return of the hæmorrhage observed; of these, four had a recurrence every month, and the other had two only, at intervals of fourteen days. This peculiarity, too, together with the marked absence in every instance save one of any excessive development of the generative organs, and the entire absence of any of the usual outward accompaniments of puberty, such as the growth of hair in the pubic and axillary regions, and permanent fulness of the breasts, serves to distinguish them from true examples of premature puberty.

The health is very rarely affected, and then only temporarily. A little restlessness has now and then been observed just before the establishment of the flow, and has then ceased; while, in one or two instances, there has been more or less fretfulness and excitement during the whole period. Beyond this, nothing has been noted in the way of impairment of the general health.

It may seem that a phenomenon of so little clinical significance is scarcely worthy of being made the subject of a special paper. When, however, having had my attention directed to the subject by the occurrence of two cases in my own practice, I consulted the many works in our own language on the diseases of children, and found that, with the exception of a word or two in Underwood,* there was no mention of the phenomenon in any book within my reach, I thought it might be worth while to ascertain what was actually known about it. With this end in view I instituted a diligent search in the library of the Manchester Medical Society, and I have embodied the result in the table appended to this paper. I cannot suppose that the list of cases is complete, but it is at any rate sufficiently full to furnish us with some reliable data, and to decide some points respecting which the most opposite statements have been put forward.

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* Underwood (M.), 'A Treatise on the Disorders of Childhood and Management of Infants from the Birth,' 3 vols., Lond., 1797; vol. ii, p. 148.

Let us look for a moment at the question of the frequency of these cases. On the one hand, Nägele* does not hesitate to say that he regards every case of precocious menstruation recorded in books as the fruit of credulity, or as a fable invented to please. It is quite evident from this that it did not happen to Nägele to meet with a single case in his own experience, and that he considered the phenomenon so improbable that he preferred to stigmatise all the records as legendary or untrue rather than believe them. On the other hand, a correspondent of the 'British Medical Journal,'† who wisely shelters himself behind a signature composed only of initials, declares that "any old, experienced nurse will be able to tell [your correspondents] that the coloured discharge from young girls is of almost daily occurrence. I have had my attention called to it repeatedly."‡ No two statements could be more widely discrepant. I am not aware of the existence of any statistics bearing on this point, but I think some help towards arriving at a just conclusion may be obtained from the following considerations:—The occurrence of a few well-authenticated cases within the last few years, differing in no important particulars from the older cases, goes far to render the latter more credible than Nägele would have us believe. The fact that an author like Scharigius, writing specially on this and kindred subjects, and at a time when the sexual organs occupied a great deal of professional attention, and when anything mysterious in relation to them had a peculiar fascination for medical writers, adduces no previously recorded cases which are not contained in the accompanying table, is greatly in favour of the phenomenon's being of rare occurrence; this is further confirmed by the fact that such writers as Barrier,§ Boivin,|| and

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* Nägele (F. C.), 'Erfahrungen und Abhandlungen aus dem Gebiethe der Krankheiten des weiblichen Geschlechtes.' Mannheim, 1812; pp. 318-328.

† No. for Oct. 9th, 1875.

‡ How far this writer's statements are to be trusted may be gathered from his opening sentence:—"I have observed frequent letters from some of your correspondents, calling attention to the so-called early menstruation of young infants;" the fact being that one such letter had appeared in the number for the previous week, and no other for at least four years.

§ Barrier (F.), 'Traité Pratique des Maladies de l'Enfance.' 3me édit., Paris, 1861; tom. 2, p. 196.

|| Boivin et Dugès, 'Practical Treatise on the Diseases of the Uterus;' trans. by G. O. Heming. Lond., 1834; p. 395.

Bouchut[*] do not, in referring to the subject, bring forward a single case as having come within their own extensive field of observation; and by the remark of Madame Louise Bourgeois,[†] *sage-femme de la reine* (1642), who, in describing a case which came under her notice, says, "Je n'avois jamais veu chose semblable." The only author of importance who speaks of these cases as being "not very rare" is Billard, in a footnote in which he refers to the observations of Dr. Ollivier (d'Angers),[‡] and which has been freely copied and adopted by subsequent writers. Dr. Ollivier, however, does not refer to a single instance observed by himself, and seems to have founded his statement on the observations of the older physicians. Billard himself does not appear to have met with an example in the living child; he only mentions certain post-mortem appearances in the case of two infants dying soon after birth, which will be referred to presently.

In reference to the question of frequency, therefore, I am led to the conclusion that Nägele and "W. D. S." are equally wide of the mark, and that, while the occasional occurrence of the phenomenon must be admitted, it is, in fact, one of considerable rarity.

With regard to the source of the hæmorrhage, the evidence is almost entirely negative. It seems to be well established that the bleeding does not take place from the external generative organs. The observation of Billard,[‡] already alluded to, is of great interest, and favours the presumption that the lining of the uterine cavity is the real source of the discharge.

The only attempt that, so far as I am aware, has been made to explain the causation of the hæmorrhage is that of Dr. Camerer in Langenau.* He thinks it is to be explained by the ligature of the umbilical cord being effected while the vessels still pulsate, and the pulmonary circulation is consequently not thoroughly established. The blood, which up to this time has been streaming from the iliac vessels into those of the umbilical cord, is necessarily urged downwards into the pelvis, and, owing to the circulation's being not yet duly regulated and active, there is produced in the pelvis a local plethora. If, by chance, the blood, collected there in abnormal quantity, fails to become duly carried off into the general circulation, it seeks an outlet for itself, which, in the female, is furnished by the pouring-out of a certain quantity from the organs of generation. How, then, does nature deal with the corresponding condition in the male, seeing that here too the umbilical cord is occasionally tied too early, with presumably similar results? Dr. Camerer does not overlook this question. He makes the very interesting suggestion that the phenomenon of a discharge of blood from the bowels, which is sometimes observed, may help us to an answer.

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[*] Bouchut (E.), 'Practical Treatise on the Diseases of Children and Infants at the Breast;' trans. by P. H. Bird. Lond., 1855; p. 552. Or, 'Traité Pratique des Maladies des Nouveaux-nés, &c.' 2me édit., Paris, 1852; p. 659.

[†] Bourgeois (L.), 'Observations Diverses sur la Stérilité...et Maladies des Femmes et Enfants nouveaux-naiz.' Paris, 1642; liv. 2, p. 23.

[‡] Billard (C. M.), 'Traité des Maladies des Enfans nouveau-nés, et à la Mamelle.' 3me édit., avec des notes par M. le dr. Ollivier (d'Angers). Brux., 1835; note to p. 366.

[§] "J'ai trouvé deux fois du sang épanché et pris en caillot dans la cavité de l'utérus, chez de petites filles mortes peu de jours après la naissance." Billard, loc. cit., p. 365.

It becomes desirable, therefore, to inquire whether hæmorrhage from the bowels in very young children has been noticed to occur more frequently in one sex than in the other. On referring to the very full account of infantile melœna given by Rilliet and Barthez,† I find it distinctly stated that boys are more subject to it than girls, and, further, that it is essentially an affection of the first few days after birth. They give, in illustration of this latter point, the following table of the age at which it took place in twenty cases:

Age.	No. of Cases.
12 to 30 hours	4
1 day	5
36 hours	1
2 days	2
3 „	1

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* Camerer in Langenau. "Ein Beitrag zur Physio-Pathologie der Blutungen aus den Geschlechtstheilen neugeborner Mädchen." 'Medicinisches Correspondenz-Blatt des Württemburgischen ärztlichen Vereines,' Band iv, p. 88. Stuttgart, 1835.

† Rilliet (F.) et Barthez (E.), 'Traité Clinique et Pratique des Maladies des Enfants.' 2me édit., 3 tomes, Paris, 1853; tome deuxième, p. 298.

Age.	No. of Cases.
6 days	2
6 „	2
11 „	1
15 weeks	1
20 „	1
	20

This may be usefully compared with a table showing the age at which the discharge from the female genital organs commenced in the twenty-five cases I have collected:

Age.	No. of Cases.
From birth	2
2nd day	2
3rd „	3
4th „	6
5th „	4
6th „	1
7th „	1
8th „	1
9th „	2
12th „	1
21st „	1
Several days (number not specified)	1
	25

These tables show that the age of those infants who are attacked by melæna closely corresponds with the age of those who become the subjects of genital hæmorrhage, a consideration which, again, lends support to Dr. Camerer's view that these two forms of hæmorrhage are merely the varying effects of the same pathological cause. This theory derives still further confirmation from an interesting fact noticed by Dr. Bednar, viz. that occasionally intestinal and genital hæmorrhages occur simultaneously in the recently born child.*

On the whole, then, the hypothesis of Dr. Camerer is shown to be consistent with many of the facts hitherto observed, and, so far as the larger part of the cases is concerned, appears to afford a reasonable explanation. It leaves, however, still unaccounted for those rarer instances, which nevertheless form one sixth of the cases here tabulated, wherein the hæmorrhage recurred at regular intervals and yet without any concurrent sign of premature sexual development.

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* Bednar (A.), 'Die Krankheiten der Neugebornen und Säuglinge vom clinischen und pathologisch-anatomischen Standpunkte.' Wien, 1850–52; dritter Theil, p. 205.

It also seems insufficient to explain the cases, three in number, where the flow did not commence until after the second week of life, namely, at the ages respectively of two, three, and six weeks. Possibly, however, these should rather be classed amongst instances of early menstruation, as in all three there was a more or less regular recurrence of the hæmorrhage, and in two it is distinctly stated to have been accompanied by the signs usually attendant upon menstruation.

In concluding this brief communication, I venture to hope that it will serve at least one useful purpose, in enabling the practitioner to reassure the minds of anxious mothers, whenever similar phenomena present themselves, by affording a means of easy reference to a number of cases where no harm resulted from the hæmorrhage, and where it exhibited no tendency *to recur*.

The following are a few supplementary references to books which there has not been occasion for quoting in this paper; all of them have been verified with the exception of the first:

Albertus Magnus, 'Commentar. Aristot. Phys.,' lib. ii (refers to a girl born with dependent breasts and hair on the inguinal and axillary regions, who was also said by her mother to have the menstrual flow).

Schenck (J.), 'Observat. Medicarum rariorum,' lib. vii. Francof., 1665; lib. iv, p. 629.

Pechlin (J. N.), 'Observationum Phys. Med.,' libri iii. Hamb., 1691; lib. i, obs. 34, p. 80.

Girtanner (C.), 'Abhandlung über die Krankheiten der Kinder.' Berlin, 1794; p. 41.

'Bibliothèque du Médecin-Practicien,' 15 tomes. Paris 1848–51; tome vi (Maladies des Enfants de la Naissance jusqu' à la Puberté, ii), p. 68.

NOTE.—No case of hæmorrhage from the female genital organs in the newly born has hitherto been recorded in which the general health has been seriously impaired thereby, and still less which has been attended with a fatal result. No assistance can, therefore, be derived in discussing the etiology of the phenomenon from a consideration of the post-mortem appearances. The two instances already mentioned where Billard found a small clot in the uterine cavity are not stated to have had external hæmorrhage during life. It will be interesting, therefore, now that an analogy has been traced between some cases of this affection and cases of melæna in the newly born, to ascertain what are the most recent views as to the pathogenesis of the latter disorder, which, from its much more frequent occurrence and its extremely fatal character, has received a far greater share of attention. It is possible that in this way some light may be thrown on the etiology of genital hæmorrhage.

In Schmidt's 'Jahrbücher,' Band 165, Jahrgang, 1875, No. 1, p. 107, Dr. Kormann gives an abstract of a pamphlet published at Breslau in 1874, entitled "'Ueber Melæna der Neugebornen nebst Bemerkungen über die Obliteration der fötalen Wege;' von Dr. Leopold Landau, Assistent an der gynäkolog. Klinik zu Breslau." I am indebted to Kormann's abstract for what follows. In his preliminary historical remarks the author notices some of the views adopted by previous writers as to the pathogenesis of melæna. It has been ascribed to injury sustained either by the mother during her pregnancy or by the child before or during delivery (Hesse, Bouchut, Rilliet et Barthez), to heredity (Rahn-Escher, Hesse, Rilliet et Barthez), to local physiological plethora of the intestinal tract (Hesse, Billard), to congenital disturbances of the nutrition of the blood-vessels (Fleischmann, Braun, Steiner), to swallowing of liq. amnii or retention of meconium (Siebold), to premature ligature of the cord (Kiwisch), to ulcers of the stomach and bowels of intra-uterine origin (Billard, Hecker-Buhl, Spiegelberg), and to inflammation of the fœtal stomach (Billard, Bohn, &c.).

Dr. Landau inquires whether there is not an etiological explanation which shall suffice for all cases of true melæna. In a case which ended fatally there were found thrombus of the umbilical vein and an ulcer of the duodenum just below the pylorus, with a vessel at its base occluded by a recent clot. The author, regarding the thrombosis of the umbilical vein as pathological and not physiological (as does Henle), explains the intestinal ulceration as due to the blocking-up of a branch of the gastro-duodenal artery by an embolus originating in the umbilical vein. His researches have led him to believe that, in the normal condition, the effect of the first act of inspiration is to withdraw the blood (by aspiration) from the umbilical vein, and so to cause collapse of its walls; but that when, from any cause, the inspiration is long delayed and the heart's action enfeebled (asphyxia), the column of blood in the umbilical vein, not being duly withdrawn, and being unable to flow, owing to compression of the umbilical artery, will stagnate and, in some instances, form a thrombus. From this thrombus he considers it easily imaginable that a portion may become detached, and, finding its way through the right heart and the ductus arteriosus, may so reach the descending aorta and become eventually lodged in one of its branches. If this branch happens to be the gastro-duodenal artery the results are necrosis and erosion of the intestinal mucous membrane, and hence, occasionally, as in the case cited, melæna. He mentions as another possible source of these emboli thrombus of the ductus arteriosus itself, the complete obliteration of which he considers also due to the first act of inspiration, which withdraws the blood from it by aspiration and diverts the current towards the pulmonary artery. An inefficient performance, then, of the first act of inspiration leaves the column of blood in the ductus arteriosus liable to form a thrombus, or, in other cases, may dispose to the formation of a clot around an embolus arrested on its passage from the umbilical vein.

The author regards the instances of isolated apoplexies of the spleen and liver of the newly born described by Kiwisch as due to embolism originating in thrombosis of one or other of these two fœtal vessels. This elaborate theory can only explain those cases of melæna which are associated with gastro-intestinal ulceration. It becomes important, therefore, to know whether such a lesion is universally met with.

In order to clear up this point, Dr. Kling, of Münich, instituted a series of observations upon seventeen cases which occurred in the Münich Lying-in Hospital ('"Ueber Melæna Neonatorum;" 'Inaug.-Diss.,' Münich, 1875; abstract in Schmidt's 'Jahrb.,' Band 167, p. 263). In two only, out of the six fatal cases, was there found ulceration of the stomach and duodenum. The remainder the author regards as capillary or venous hæmorrhages. He says, in conclusion, that, although the explanation given by Landau is applicable to many cases, it remains an open question why melæna is so rare, notwithstanding the frequent interruption in the development of the lesser circulation and first inspiration, and is, on the contrary, proportionately frequent where these causes are absent.

No.	Observer.	Place.	Date of Observation.	Age of infant when flow commenced.	Duration of flow.	Recurrence.
1	Bourgeois (Louise)	Paris	—	8 days	10 or 12 days	None mentioned
2	Weisius (M.)	Berlin	—	11 days	—	Do.
3	Kerckringius (T.)	Leyden	Oct., 1668	From birth	15 days	Monthly for 3 mo when death occu red from epilepsy
4	Solingius (C.)	—	1679	2nd day	—	Monthly to 14 month
5	Bohnius (J.)	Leipzig	—	3rd day	—	None
6	Bohnius (J.)	Leipzig	—	4th day	—	Monthly to 12 yea of age
7	Sommers (J. G.)	Arnstadt	March, 1692	8 days	—	Recurred in 3 day when, with inte vals of a day or tw it lasted a month
8	Cummenius *vel* Cummenus	—	—	20 days	—	Monthly until dea at 10 months fro smallpox
9	Müller (J. M.)	—	Aug., 1718	3rd day	3 days	Twice at intervals 14 days
10	Gahrliep (G. C.)	—	—	8 days	5 days	None mentioned
11	Hünerwolffius (J. A.)	Arnstadt	—	From birth	5 days	None
12	Buxtorf (J.)	—	—	7 days	5 days	After lapse of a yea
13	Carus (C. G.)	Dresden	March, 1819	5th day	3 days	Not known

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General condition.	Abnormal appearance of genital organs.	Remarks.	Where recorded.
Not mentioned	Not mentioned	—	Bourgeois (Louise). Observations diverses sur la Stérilité . . . et Maladies des Femmes et Enfants Nouveaux-naiz, Paris, 1642, Livre 2me, p. 23
Do.	Do.	—	Sennertus (D.), Opera; tomus tertius. Lugd., 1650, lib. iv, part ii, sect. ii, cap. 2, p. 51
Do.	Do.	During pregnancy, the mother in a fit of anger, began to menstruate, and did so regularly; for 15 days before delivery the flow was continuous	Kerckringius (T.), Opera Omnia Anatomica; editio tertia. Lugd. Bat., 1729, obs. lxxxvii, p. 168
Do.	Do.	—	Wiel (C. Stalpart van der), Observ. rar. Medic. Anat. Chir., Leidæ, 1727, cent. i, p. 338.
Do.	Do.	Died in third year from an acute fever, having had no recurrence until a few hours before death (?)	Bohnius (J.), Circulus Anatomico-Physiologicus. Lips., 1686, p. 243.
Do.	Do.	—	Ibid.
f sanguine temperament; healthy and lively	—	—	Abhandlungen, Med. Chir. Anat. Chym. und Botan., xx Thiel, Nürnb., 1771, p. 135.
Not mentioned	Do.	—	Schurigius (M.), Parthenologia, Dresdæ, 1729, p. 137; and Franck (G.), Satyræ Medicæ, xx, Lips., 1722, p. 95; quoted from Miscell. Nat. Cur., Dec. 1, an. 3, obs. 114, p. 185.
Do.	Labia pudendi turgid on 3rd day	On 3rd day a clot in vagina	Schurigius (M.), Parthenologia, Dresdæ, 1729, p. 137; quoted from Ephem. Acad. Nat. Cur., cent. 10, obs. 68, p. 376.
ould not pass urine on 5th day; on 8th day weeping and groaning	Not mentioned	—	Schurigius (M.), Parthenologia, Dresdæ, 1729, p. 137; quoted from Miscell. Nat. Cur., Dec. 3, an. 7 and 8, obs. 40, p. 259.
Not mentioned	Do.	—	Schurigius (M.), Parthenologia, Dresdæ, 1729, p. 137; quoted from Miscell. Nat. Cur., Dec. 1, an. 9, obs. 100, p. 172
"Sine noxa"	Do.	—	Commentarii de Rebus in Scientia Naturali et Medicina Gestis, Lips., 1773, vol. xix, p. 527; quoted from Acta Helvetica Phys. Math. Anat. Bot. Med., Basil., 1772, vol. vii, p. 107.
Good	Not mentioned	Mucous in character on 25th March (first day), afterwards sanguineous	Zeitschrift für Natur. und Heilkunde, II Bd., Dresden, 1822, p. 106

No.	Observer.	Place.	Date of Observation.	Age of infant when flow commenced.	Duration of flow.	Recurrence.
14	Plieninger	Stuttgart	Autumn of 1825	3 days	2 days	None
15	Mallat	Paris	Aug., 1832	Several days	10 days	None mentioned
16	Truchsess	Winnenden	April, 1833	2 days	6 to 7 days	None (up to 3½ years)
17	Camerer	Langenau	July, 1833	3 days	4 days	None
18	Witz	Haigerloch	Sept., 1834	4 days	—	None mentioned
19	Richelot	—	1846	2nd day	4 to 5 days	None
20	Whitmore	—	—	Few days	—	Regular at periods of 3 weeks and 2 or 3 days until death, at age of 4 years
21	Ashton (J. H.) (communicated by patient's mother)	Grayton, King's Lynn	1864	About a fortnight	—	Every one, two, or three months to the age of four; since then menstruated regularly
22	Duncan (J. M.)	Edinburgh	—	2nd day	6 days	None
23	Cunningham (communicated by Dr. J. M. Duncan)	Currie, near Edinburgh	"Recently" (writing in 1851)	2 days	4 days	None
24	Schwedler	New York	"8 or 10 years ago" (writing in 1869)	6 weeks	—	Monthly
25	Bouteiller (J.)	—	Dec., 1863	3 days	Very few days	None (to 17 months)
26	Mettenheimer (C.)	Schwering (Mecklenbg.)	Mar., 1865	5 days	3 days	None
27	Birchenall (J.)	Macclesfield	Aug., 1865	5th day	5 days	None

General condition.	Abnormal appearance of genital organs.	Remarks.	Where recorded.
Unaffected	None	—	Med. Correspondenz-Blatt des Würt. ärztlichen Vereines, Stut., Band III, 1834, p. 200.
Much crying; otherwise healthy	Pudenda enlarged; clitoris and nymphæ excessively prominent	Mammæ at first natural; afterwards much enlarged, exuding on pressure a clear white fluid	Boivin et Dugès, Practical Treatise on the Diseases of the Uterus; trans. by G. O. Heming, Lond., 1834, p. 395.
Healthy	None	—	Med. Correspondenz-Blatt des Württemb. ärztl. Vereines, Stuttgart, Bd. V, 1835, p. 400.
Restless previous night; otherwise healthy	None	Five days after this hæmorrhage the breasts became swollen	Med. Correspondenz-Blatt des Wurttemb. ärzti. Vereines, Stuttgart, Bd. IV, 1835, p. 88.
—	Labia pudendi somewhat swollen	—	Med. Correspondenz-Blatt des Württemb. ärztl. Vereines, Stuttgart, Bd. V, 1835, p. 179.
Some excitement with crying	None	—	Journal für Kinderkrankheiten, Band VI, Berlin, 1846, p. 70.
—	Female organs and lower limbs considerably developed; breasts unusually large	—	Taylor (A. S.), 'Medical Jurisprudence,' 6th edit., Lond., 1858, p. 680, quoted from 'North. Journ. Medicine,' July, 1845, p. 70.
Fine healthy girl; seven years old at the time of writing	None	Flow accompanied with pain in back and loins, and enlargement of the breasts. Mother began to menstruate at 9, and a great aunt at 7, both of whom continued to do so regularly	Lancet, vol. i, 1871, p. 166.
Fine, strong, and healthy	None mentioned	Mammæ began to swell on 3rd day, subsiding when the hæmorrhage ceased; menstruation recommenced in the mother 4 weeks after delivery, and recurred regularly during the whole period of nursing	'The Monthly Journal of Med. Science,' vol. xiii, Edin., 1851, p. 493 ('Proceedings of Edin. Obstr. Soc.,' June 25th, 1851).
Strong and healthy	None mentioned	Mammæ enlarged and indurated during the flow	Ibid.
Healthy	None mentioned	*Molimina mensium* (?) 3 weeks after birth, followed in three weeks by the flow	'The American Journal of Obstetrics,' vol. i, New York, 1869, p. 175.
Feeble constitution	None	Defective symmetry between the vertical halves of the head and right talipes varus	Gazette des Hôpitaux, Paris, 1866, No. 137, p. 542, from Union Médicale de la Seine-Inférieure.
Healthy	Hymen appeared like a swollen circle	—	Journal für Kinderkrankheiten, Band LVI, Erlangen, 1869, p. 8.
Born asphyxiated; respiration established in half an hour	Vulva injected	At end of month precisely a sero-sanguineous discharge from the bowels; alvine evacuations remaining normal	Brit. Med. Journ., Lond., Nov. 25th, 1865, p. 550.

No.	Observer.	Place.	Date of Observation.	Age of infant when flow commenced.	Duration of flow.	Recurrence.
28	Ritter von Rittershain	Prag	1865	6 days	—	None mentioned
29	Cullingworth (C. J.)	Manchester	Nov., 1871	4th day	4 days	None
30	Cullingworth (C. J.)	Manchester	May, 1875	5th day	2 days	None
31	Cathcart (S.)	Wigan	Sept., 1875	5th day	Nearly 4 days	Published before month had transpired
32	Kahleis	Gröbzig	—	4th day	11 days	None to age of one year

General condition.	Abnormal appearance of genital organs.	Remarks.	Where recorded.
No ill result	Not mentioned	—	Journal für Kinderkrankheiten, Band LVI, Erl., 1869, p. 5, quoted from Jahresbericht d. K. Cöhm. Land.. esfindelanstalt in Prag., 1865-6, nach Virchow und Hirsch, Jahresbericht von 1866, ii s., 547.
Unaffected	None	—	Brit. Med. Journ., Lond., Oct. 16th, 1875, p. 514.
Restless a few hours previously	None	—	Ibid., p. 514.
Restless during the preceding night	None mentioned	—	Brit. Med. Journ., Lond., Oct. 2, 1875, p. 447.
"Lively"	Not mentioned	—	Journal der practischen Heilkunde; herausg. v. C. W. Hufeland and E. Osann, Bd. LXVIII, II Stück, Feb., Berlin, 1829, p. 85.

REMARKS ON THE TREATMENT OF SOME ALLIED FORMS OF SKIN DISEASE.

BY JAMES A. RIGBY, M.B. LOND., PRESTON.

THE diseases of the skin to which I refer are lupus, favus, and impetigo of the head and face, the mode of alliance being the presence in each of some form of local irritation in the shape either of a nodular deposit of granulation tissue in the skin in lupus, or the growth of a fungus (the Achorion Schönleinii) about the roots of the hair in favus, or the presence of pediculi in the head in impetigo capitis. A further mode of alliance between these diseases exists in the fact that they are all more or less accompanied by the formation of crusts, which, when removed, leave an ulcerated surface. It is not usual to class these diseases together, and, in this case, it is merely done in order to point out a mode of treatment which is at once simple and successful.

When we consider the different modes of treatment that have been suggested in lupus, *e. g.* the application of powerful caustics, the galvanic cautery, the actual cautery, &c., and in favus, *e. g.* the application of different parasiticides after the removal of the hairs by epilation, together with the frequently unfavorable results after long and anxious treatment, any mode of treatment which attempts relief, if it be simple and effectual, must be looked upon with at least a partial eye. The first object in the treatment of all these forms of disease is the removal of the scabs or crusts. This can be readily effected in most cases by anointing the part affected every night for ten minutes or a quarter of an hour with olive oil, using the oil freely, and following this up by fixing a hot linseed-meal poultice over the affected part and allowing it to remain untouched till the following morning, when the part may be thoroughly cleansed by means of warm water, and so prepared for the application of any appropriate or desirable remedy. I may say that prior to this it is best in favus and impetigo capitis to have the hair cut as close as can conveniently be accomplished with a pair of scissors. The applications I subsequently use vary with the case. In lupus an excellent remedy to apply is the ointment of the red oxide of mercury used freely over the ulcerated surface twice or thrice daily. In favus, painting the head with tincture of iodine night and morning at first, and after a time at night only or every other night, has proved most serviceable in my hands. In impetigo, after the removal of the scabs, the application of a little of the Unguentum Hydrargyri Ammoniati has speedily effected a cure. This removes any pediculi which may be present as well as acting beneficially on the ulcerated surface. The constitutional treatment consists in the administration of tonics, nutritious diet, cod-liver oil, &c. I usually give in favus and lupus small doses of some mild preparation of arsenic, though it is doubtful if this much influences the result. The following two cases may prove interesting as illustrating the above method of treatment:

H. O—, æt. 26, presented himself with a large patch of lupus on his right cheek, extending from the nose to the lower jaw and upwards almost on a level with the malar bone. Part of the right ala of the nose was gone, and the left ala of the nose was becoming affected, being red, swelled, tuberculated, and slightly hyperæmic. The eruption was painless, nodular, red, and crusted over. It had been progressing slowly for six years, and was still progressing, notwithstanding that he had been under treatment at various times since its commencement. The calibre of the nostril was much diminished. The treatment was that recommended above, viz., anointing freely with oil, poultice on all night, on the following day the application of the ointment of the red oxide of mercury, with the internal administration of arsenic, tonics, and cod-liver oil. The same course was pursued every night; the good effects were rapidly visible; first the passage of air was less obstructed through the nostril, then the tubercles on the face and nose became less, and finally disappeared, a thin, shiny seam of white cicatrix spreading outwards from the middle of the cheek as a centre, and gradually invading the site of the disease. At the end of about four months the cicatrix alone remained.

R. G—, æt. 21, stated that when about five years of age he had been playing with another child and used its cap. Soon after he noticed an eruption on his head, which had increased ever since. Had had no treatment for it, as he had been ashamed to expose his head to anybody, and had worn his cap at all times, both indoors and out, for years. On removing his cap, and, in fact, before, the disgustingly characteristic odour of favus was powerfully apparent. The head was completely covered with the yellow cup-shaped crusts fringed by a margin of hair. Microscopical examination of a hair showed the sporules in abundance. The treatment in this case consisted in first cutting the hair short, then at night anointing profusely with oil, followed by the application of large linseed-meal poultices to the whole of the affected part. Each morning the oil was thoroughly removed by washing and tincture of iodine applied. This was repeated at night. A rapid and uninterrupted recovery took place. Within a fortnight the cup-shaped depressions had all disappeared, and the head was of a smooth, shiny appearance. The odour was almost imperceptible. The subsequent progress of the case was equally satisfactory.

NOTES OF A CASE OF SPINAL IRRITATION.

By Wm. BERRY, L.R.C.P. & S. Ed., M.R.C.S. Eng., Wigan.

Preliminary.—According to Niemeyer, "'spinal irritation,' which for a time caused a good deal of talk, is a term used to indicate a condition chiefly characterised by sensitiveness of certain spinal processes to pressure, great inclination to reflex movement, and general hyperæsthesia. We find these symptoms just as frequently as we do headache in many acute and chronic diseases, without its being possible to interpret them. At all events, we are not justified in deciding from their presence, without further proof, that there is hyperæmia of the spinal marrow, any more than we are in diagnosing cerebral hyperæmia in patients who have only headache" ('Practical Medicine,' vol. ii, p. 258).

Dr. McCall Anderson, of Glasgow, in a clinical lecture of which I have notes, says that "the essence of the disease consists of some congestion or low form of inflammation of the spinal cord and roots of the nerves."

In Tanner's 'Index of Diseases,' under the head of "Spinal Irritation," we have the following description:—"Probably no disease exists deserving this name. The symptoms mostly observed in women—pains about mammæ, thorax, abdomen, or uterus, tenderness on pressure over spinous processes of certain vertebræ; the suffering due to a combination of myalgia and hysteria with constitutional weakness."

It is probably owing to the latter opinion that the treatment of these cases is neglected by general practitioners. Their tediousness in yielding to treatment, their non-fatality, combined with the worry occasioned by the anxiousness and questionings of nervous patients, cause little or no interest to the general practitioner;

hence, such patients are driven to seek aid from doctor to doctor, from homœopath to hydropath, and from these to charlatans, employing nostrums and other aids of a less rational or scientific kind, till at last they give up in despair, becoming chronic invalids.

The suffering that may be prevented by ordinary interest and attention being paid to the treatment of these symptoms in those unfortunate enough to be so afflicted cannot readily be imagined, and as it is the duty of medical practitioners following their calling to alleviate and prevent human suffering, as well as cure disease, one successful case will well repay the trouble bestowed upon it.

To show that such cases will yield to treatment I report the following case:

Miss M—, æt. 30, dressmaker, of a highly nervous temperament, spare habit of body, and of sedentary habits, came under my care on August 9th, 1874. She had previously consulted several medical men, but with only slight benefit.

History.—Six or seven years ago, while descending some steps, she slipped and fell backwards; this shook her and bruised her back, but eventually she quite recovered from the effects of the fall. About two years ago, after working hard at her business, her back commenced to get stiff and pain her; remembering the fall she had had, she attributed these symptoms to its effects. The pain was chiefly at the commencement of the lumbar spinous processes; this prevented her from going out much, and after standing for some time left her with a feeling of exhaustion. Tincture of iodine painted on the spot, belladonna liniment and plasters afforded some relief, but lately the pain has increased, making locomotion and sewing a burden to her. She has been unable to get outside the door for the last few weeks, and for eighteen months has been unable to get to church, which is not more than three or four hundred yards distant.

Symptoms.—Complains of pain, which is increased on pressure along the spinous processes of the lower dorsal vertebræ, and especially the last one; pressure causes acute pain, bringing on a feeling of faintness; there is hyperæsthesia of the skin all down the spinal column, and she is very nervous. She cannot stand erect, therefore walks in a semi-stooped position; the pain is greatly increased when she makes a false step or gets a sudden start. She has not been able to lie on her back in bed for some time, and any movement in the room gives her pain. At times the pain is more severe than at others, passing around under the ribs and causing a sensation like constriction. She suffers occasionally also from facial neuralgia.

The menstrual function is performed normally and regularly, but the pain is increased at this time, and there is no uterine affection as far as can be ascertained without special examination.

Tongue clean; bowels slightly confined; appetite poor; says she suffers from indigestion at times.

Pulse 90, small and feeble.

Treatment.—A liberal diet was enjoined and a mild aperient occasionally. Half a glass of port three times a day, with a biscuit. To take moderate exercise out of doors when the weather is suitable.

To take a mixture containing aromatic spirits of ammonia and compound tincture of valerian three times a day, and apply to the back night and morning a liniment of belladonna, aconite, chloroform and soap liniment.

The spine to be sponged daily with tepid water and dried gently.

August 27th.—Has improved a little; digestive organs in a better condition, and she can walk a little better. Pain over the lower dorsal vertebra very severe on pressure.

Ordered Boggio's sinapisms to be applied, three being used in succession; as soon as the effects of the previous one has passed off apply another.

Sept. 22nd.—Slight relief from sinapisms; still great tenderness on pressure. Ordered *tonics*, quinine, &c., and pills containing valerianate of zinc.

Oct. 7th.—Feels much better in health, pain and hyperæsthesia of skin still present. I now applied blistering fluid to a space 4 by 1½ inches over the lower dorsal and upper lumbar spines.

Nov. 4th.—Had very great pain from the blister the day on which it was applied; almost produced fainting. Pain and hyperæsthesia of skin much diminished, even when pressure is made. Blister is quite healed, and she is able to get a few yards from the door, and walks more erect. Repeat the blister and take in place of other medicines a mixture of quinine and iron, and to take thirty minims of aromatic ammonia and the same of valerian tincture when she feels faint.

Dec. 10th.—Progressing favorably; can walk all round the house with a little assistance. Not much pain on pressure. To use the liniment and sponge the spine daily, using gentle frictions.

Jan. 6th, 1875.—Still improving. Discontinue all medicines.

27th.—There is still some pain on pressure over the lower dorsal spines, although she walks and feels much better. During the last two menstrual periods the discharge has been profuse, lasting five or six days, and there has been some pain accompanying it. Repeat the blister. Ordered the following mixture to be taken at the commencement of and during the next menstrual period:

℞ Potassii Bromidi gr. 120,
Ext. Ergotæ Liquidæ fl. ℥ss;
Aquam ad fl. ℥viij;
Cujus capiat coch. ij, amp. ter in die.

Feb. 11th.—Very much better after last blister; has been able to walk as far as the next street. Pressure is borne over the spinous processes much better.

March 3rd.—Still keeps improving; there yet remains a little pain when pressure is made. To paint the painful spot twice a week with Lin. Iodi, B. P.

24th.—Gets out three or four times a week; walks erect and without fatigue. The last two menstrual periods normal.

April 28th.—The tenderness on pressure almost *nil*, is able to get a tolerable distance from home without inconvenience.

Sept. 23rd.—I am informed that my patient still keeps better. She is now able to walk to and from the church, what she has not done before for over two years; the tenderness over spinous processes has disappeared.

UNUNITED FRACTURES, NEW OPERATION FOR.

By MATTHEW HILL, F.R.C.S., M.R.C.P. E., Bootle, Liverpool.

The operation to which I devote the following pages I have ventured to call "*new,*" but it might with less brevity, but greater accuracy, be described as "a new modification of Dieffenbach's operation." This latter consists in opening up the seat of fracture, and driving ivory pegs into the ends of the bony fragments, with the intention of exciting such an amount of inflammatory action as will result in the throwing-out of reparative material to be afterwards consolidated into *callus.* The theory and practice of this operation has had the sanction of the highest surgical authorities and a large share of success since it was originated in 1845, and still continues to hold its ground, notwithstanding the many other aspirants to surgical favour which have appeared. It may not be out of place here if I make a short *résumé* of the different procedures which from time to time have been recommended and adopted to cause bony union in those troublesome fractures. The number and variety alone of the plans should suffice to prove the intractability of these cases, and the hopelessness of finding any one a panacea for all. As an aid to memory and comparison it may be convenient to divide these remedial measures into three classes, viz.:—*First,* those which do not alter the fracture from its "simple" or unexposed condition. Amongst such are blisters* and other stimulating applications to the skin;† friction of the broken ends of the bones against each other;‡ subcutaneous scarification;§ acupuncture by needles, hot, cold, or galvanic;‖ malleting the fracture; compression,¶ &c. In the *second* class may be included such procedures as are transitionary between the first and third classes; that is to say, while they cause some slight communication of the fracture with the external air, and are frequently accompanied by suppuration, yet do not absolutely expose the bone; such are the setons,* cauteries actual and potential,† and the metal skewers, screws, or wires which transfix the bone, but project through the flesh.‡ Lastly, in the *third* class must be placed those operations which to all intents and purposes render the fracture "compound," such as Dieffenbach's§ and the various plans for resection,|| with or without pinning or wiring the bone-ends together, denuded or not of their periosteum.¶

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* Brodie, Walker, Velpeau.

† Malgaigne, Fleury, Buchanan.

‡ Celsus, White, Hunter.

§ C. Bell, Blandin, Miller.

‖ Malgaigne, Wiesel, Rrennan.

¶ Amesbury, Bonnet.

Any and all of these proceedings require to be aided by some form of apparatus which shall fix and steady the limb, for I need scarcely say it is in the limbs alone our interference is required, if we except some rare cases in the lower jaw. The instrument for firmness and adaptability is best made of iron, much after Liston's modification of MacIntyre's; but instead of the extending screw beneath the leg the same object is much better secured by a small endless screw working in a toothed wheel not larger than a halfpenny, which is fixed on one side of the hinge at the knee-joint. The endless screw is finished off with a square or triangular head, and is acted on by a removable key. The apparatus may be connected with the body by a joint at the hip, and a broad abdominal belt as designed by Dr. H. Smith, of New York, thus enabling the patient to get about on crutches if his health suffers from too-prolonged confinement. *A propos* of this it cannot be too strongly insisted on that *there must be no hurry or impatience of result*; it is at all times difficult to draw the line between delayed and ununited fracture, and impatience may convert the one into the other.

I have omitted any mention of amputation, as it cannot be

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* Physick, Winslow, Weinhold, Oppenheim, Liston.

† Cline, Earle, Ollenroth, Mayor, Kirkbride.

‡ Bickersteth, Brainard, Sommé, Pancoast, Gross.

§ Dieffenbach, Square, Stanley, Bowman, Bushman.

|| White, Rowlands, Dupuytren, Roux, Gaillard, Rodgers.

¶ Jordan, Sédillot, Bigelow, Horeau.

classed as a cure for these unfortunate cases, although often necessary as a *dernier ressort*. It is an acknowledged principle in surgery that in no case should a severe or major operation be performed where a minor or less-dangerous one promises a fair chance of success. Accordingly, one or more of the measures in Class 1 having been tried and failed, as they often will, then some of those in Class 2 or 3 should be selected, according as they are best suited to the state of the patient and the seat and nature of the fracture. In many instances, especially in the femur and humerus, it is considered "advisable not to employ the seton, but to pass on at once to Dieffenbach's plan,"* as being attended with less danger. Such a case is the one I have now to relate.

Mr. W—, æt. 35, a gentleman of untainted constitution and active habits, had his thigh broken by a railway collision at Wigan on the 25th of December, 1874. He sustained a few other superficial injuries, and was exposed for some hours in the frost and snow. The fracture, which occurred at the junction of the middle with the lower third of the femur, was "simple," and oblique in direction. It was carefully attended by an experienced surgeon at Wigan, who put him up on the long splint, afterwards on a MacIntyre, and finally in plaster-of-Paris bandage. At first all seemed to progress favorably, but at the end of seven or eight weeks he found the fracture still ununited, and requested a consultation upon the patient's case. As I had attended this gentleman before, I was summoned to Wigan, and after carefully examining all the details we made out that Mr. W—'s ununited fracture was mainly to be attributed to a hacking throat-cough (caused by an elongated uvula), which constantly shook his frame and jerked the fragments, more especially the upper. At the same time his bodily condition was soft and flabby from long confinement to bed, so much so that we considered it unadvisable to subject him to any operative procedure just then beyond snipping the elongated uvula and painting the throat with perchloride of iron, which very much checked the cough. As for the limb, a large piece of Cocking's poro-plastic felt was moulded into an admirable splint, quite enveloping the thigh, and when tightly strapped enabling him to get about on crutches, and even to bear a little pressure on the foot. After a couple of weeks' hobbling about in this way his health much

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* Holmes's 'System of Surgery,' vol. ii, p. 93.

[illegible] ivory stilettes of the same length and diameter (or slightly tapering) as the drill. The drill and stillettes are similarly graduated in half inches, and the ivories are, moreover, grooved like a director in order to slide along the drill. The *modus operandi* consists in entering the drill through a puncture made by a tenotome down to the bone; the depth of the soft parts is now read off by means of the graduations; then, if it be desired to bore into the bone to the depth of an inch, the drilling is proceeded with until the steel has penetrated an inch further than the original reading. The ivory stilette is now filed *half way through* an inch from the point (see drawing), and after being soaked in carbolic oil is guided by its groove down alongside the drill to the brink of the perforation in the bone, from out of which the steel is next lifted, the ivory slipped into its place, hammered, and by a smart lateral movement broken off at the filed notch. The operation is completed by withdrawing the remainder of the stilette and sealing the puncture with a bit of lint and plaster. By carefully following the foregoing details it will be found that an inch peg is accurately placed in an inch hole, consequently there is no portion of it projecting into the flesh, and of this we may be certain by seeing before it is broken off that the reading on the ivory at the surface of the skin tallies with the previous reading on the drill, both being graduated alike. A further object is secured by the peg being grooved; a channel is thereby provided for the escape of fluids in the event of osteomyelitis being set up, thereby avoiding the danger and suffering caused by the damming up in the bone of inflammatory fluids, as would necessarily be the case were the peg solid. If the fracture be oblique or the position of the fragments suitable the drilling may be pushed on into the other portion of the bone, after which a longer peg of ivory can be inserted to hold both pieces together; this, although difficult, is by no means impossible, and would require some slight modifications in the apparatus. The foregoing plan of the operation was submitted to, and kindly approved by, the gentlemen before mentioned; indeed, to Mr. Harrison I am indebted for much aid and valuable suggestions in maturing the details, and we tried it together on the dead subject before venturing it upon the living. All being in readiness, the operation was performed, in the manner just described, on the 21st of last May, when we successfully inserted one peg in the upper and two in the lower fragment. One of the latter pegs was notched to break off one inch from the point as the others had been, but owing to a flaw in the ivory as well as being very deep and tightly gripped by the muscles it broke off about an inch and a half long instead, thus leaving about half an inch projecting above the bone. In spite of this the three punctures healed in twenty-four hours without the development of any pus or constitutional excitement then or afterwards. Thus far we demonstrated the safety and practicability of performing Dieffenbach's operation by the subcutaneous method, and I wish I could add, at least for the patient's sake, that our operation had achieved its intention of exciting local action in the bones, but after giving him plenty of time and rest the fracture is now as loose as ever. The pegs are not felt; in fact, at no time did they give rise to so much local action as we could have desired, and I cannot but think that in this case the patient's osseous system must be unusually tolerant of injury. The operation has failed in this case, the only one in which it has yet been tried, and is so far a discouragement to any further trial of it, for after all "nothing succeeds like success;" but it should be remembered that in this case Dieffenbach's own plan would have failed, and that in many after everything has been tried, amputation has been found necessary.

One point worthy of notice is that in case of the pegs' exciting suppurative inflammation and the formation of abscess requiring the laying-open of the fracture the patient is in no worse position as to the wound than the original operation requires; but it must be confessed that in these days of antiseptic surgery the exposure of bones and even of joints is not the formidable thing of the past. Respecting the apparent disappearance or absorption of the pegs in the foregoing case—for no trace of even the broken one which projected into the soft parts appears to be left—it is interesting to recall Mr. Savory's experiments on the absorption of dead bone ('Med.-Chir. Trans.,' vol. xlvii, p. 103). From these it would appear that one essential towards absorption is firm contact, as in a peg tightly driven into a hole, one which is loosely placed not being affected. To sum up, the operation is, as it always has been, scientific from a physiological point of view; the new modification of it must be allowed to be practical from a mechanical as well as a physiological point of view; its utility requires to be further tested, and I trust will be notwithstanding the cloud of failure which overshadows its first trial. It may be expected to succeed in any case in which Dieffenbach's method promises success, and likewise to fail where that operation has hitherto failed. The supposed influence of phosphorus over the production of new bone has not received any support from the history of this case, for the patient took it regularly for two or three months, and the present condition of the fracture is perhaps looser than ever; the ends of the fragments are atrophied, rounded, and overriding, although the shortening is only from half to three quarters of an inch. I find it impossible to give any adequate cause for the refusal of the bones to unite in this case. As I have said, the patient is apparently of untainted constitution; there is no history of excesses, syphilis, cancer, scurvy, or scrofula; he is well nourished (rather inclined to over-fatness if anything), and the only thing which the mind in casting about for a cause can invest even with a shadow of suspicion is that he has had acute rheumatism more than once, although not lately. But against this we know that wasting, atrophy, or degeneration of bone from rheumatism is only found in very chronic cases (Paget, 'Surg. Pathol.,' p. 304), and mostly at the articulations; moreover, all experience is against the supposition that changes from this cause have much influence until the patients have become somewhat advanced in life. I am satisfied that, if any portion of the soft tissues by intervening between the fragments had prevented union, this obstacle would have been long ago removed by absorption due to the firm pressure to which the limb was subjected in the apparatus before referred to. It may be that, the fracture having occurred below the entrance of the nutritive artery, the fragments have not received sufficient blood to carry on vigorous nutrition (for the influence of this condition see Mr. Curling in 'Med.-Chir. Trans.,' vol. xx); but this hypothesis may be fairly met by the objection that hundreds of other femora unite for one that fails, although all the fractures may be pretty much alike as to position. Undoubtedly motion was the main cause of non-union at first, but in the subsequent treatment this was carefully guarded against, as was also every other possible cause of aberration, so that the conclusion seems inevitable that "it is an example of arrested development of the reparative material, and may be in this respect compared with the condition of granulations whose cells persist in their rudimentary form."*

For fuller details and authorities consult Mr. Hornidge's admirable article in Holmes's 'System of Surgery;' see also Gross's 'System of Surgery,' London and Philadelphia; also Norris in 'Amer. Jour. Med. Sci.,' January, 1842, the fullest article on the subject of non-union in fractures.

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* Paget's 'Surg. Pathol.,' p. 193.

Note and postscript, 2nd December, 1875.—On the 12th of last month, and after the foregoing paper was sent in to the Editor, I resected the ends of the broken femur. The difficulties and trouble of this operation were so great, especially in baring the lower and deeper fragment, that I must endorse Mr. Rowland's opinion, who stated that he should hesitate to recommend it ('Med.-Chir. Trans.,' vol. ii, 1813). So many others have also testified to the same dangers and difficulties that the operation of subcutaneous pegging, which may be done with ease and certainty, should have further and more extended trial in the face of such a formidable alternative.

GLEANINGS FROM PRIVATE PRACTICE.

By JOHN HADDON, M.A., M.D. Edin., Gold Medallist, Eccles, Manchester.

Cases in private practice can seldom be so well observed and recorded as those occurring in hospital; nevertheless I trust that the following cases, though gleaned from private practice, may not be devoid of interest to the profession.

Case I.—*Typhoid fever, with an exaggerated form of sudamina.*

J. O—, æt. 25, did not feel well for some days before August 28th, when he shivered for the first time. From that day he felt weak, and had a slight cough.

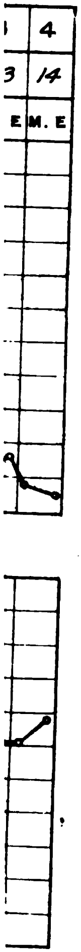
On September 6th, the 10th day of his illness, the tongue was furred and dry, the bowels were regular, the pulse at 6 p.m. was 112, and the temperature 103·8°. Two or three rose spots were seen on the abdomen. Diarrhœa began in the night and continued till the 15th day.

On the 13th day there was slight delirium, which increased and continued till the 15th day.

On the 16th day the skin became moist.

On the 17th day perspiration became profuse, and continued markedly so till the 22nd day, when the neck and chest were found to be covered with a copious eruption of sudamina, like small drops, clear or yellowish in colour. On the abdomen a few red spots were seen, disappearing on pressure, and also some vesicles with a red areola round them. They were not umbilicated, and there was no hardness round the base. On the back, especially over the right hip, across the loins, and as high as the angles of the scapulæ, were a great many vesicles and pustules, varying from the size of half a pea to that of half a hazel-nut. Several had ruptured, leaving raw sore spots as large as a sixpence, surrounded by shrivelled cuticle. All over the back there was a rash composed of small bright-red points. It was observed that the eruption was most marked over the parts on which he had generally rested, when the perspiration was so profuse. On inquiry I found that he had complained to the nurse on the 18th day of some spots on his body, but as I did not disturb him while the perspiration was so profuse they were not observed till the 22nd day. The eruption did not annoy him much, and the sore places left red marks which disappeared on pressure. He became delirious again during the afternoon of the 22nd day, and continued so until the 27th day.

He had a chop for dinner on the 28th day, and with the exception of some boils, which were troublesome, his convalescence was all that could be desired.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Appended is a diagram of the temperature and the pulse, which shows the course of the fever, and supplies the place of a more extended report.

Remarks.—This was a pretty severe case of typhoid fever, about which, with the exception of the peculiar eruption, there was nothing very noteworthy.

So far as can be made out the eruption began to appear on the eighteenth day of the fever, just the day following the commencement of the perspiration. When first seen on the twenty-second day it very much resembled pemphigus, but on closer examination it was found to be an exaggerated form of sudamina.

The upper part of the chest and neck were covered with sudamina of the usual appearance, like tears; some were quite limpid, while others had a yellowish tinge. On the abdomen there were a few large vesicles and pustules; they consisted of an elevation of the cuticle containing a fluid varying from clear serum to yellow, thickish pus. There was an areolar round their bases, but no induration whatever. All over the back a red rash was seen consisting of bright red points disappearing on pressure. From the angles of the scapulæ downwards, over the loins and hips, were scattered a number of large vesicles or pustules similar to those on the abdomen; there were a few on the right thigh also; they varied from the size of a pea to that of about half a hazel-nut. When matured, the cuticle ruptured and a red raw surface was left, with the shrivelled cuticle round the margin He did not complain of any pain in these spots; they soon healed up, leaving a red mark, disappearing on pressure and gradually fading till it could hardly be distinguished from the surrounding skin. From the time of the formation of the vesicle until the pustule broke would be about eight days, and the marks left could easily be distinguished a fortnight later.

On referring to Murchison's treatise on continued fevers I find that Louis observed sudamina in 104 out of 141 adults affected with typhoid fever, Jenner in 7 out of 23 fatal cases, and Murchison himself saw them only in 12 out of 53 cases.

Louis in his work on typhoid gives a very full account of his observations.

He found them in 6 out of 9 fatal cases in which he looked for them; they varied in size from a quarter of a line to two lines or more in diameter; they were most numerous about the neck and the scapulo-humeral articulation, and in the interval between the vesicles the epidermis came off with the slightest rubbing, as sometimes occurs in those who die from some eruptive disease. He did not find any constant relation between the sudamina and perspiration. Sometimes they occur with sweating, and sometimes independently of it, and from this he argues that they depend upon some affection of the skin not yet recognised. He has never known them occur before the twelfth day of the disease, and their duration varied from three to ten days. In two cases he had observed them cover the greater part of the surface of the body.

In the case related they covered the greater part of the surface of the body, and the diameter of some of them was fully half an inch. Considering that Louis in his experience never met with a case such as this, we may regard it as not unworthy of record.

Case II.—*Meningitis.*

E. H—, æt. 43, an engine driver, consulted me on April 22nd, 1871, and stated the following facts:—He has a brother and sister who are subject to epileptic fits. As to himself, he has always been a strong and healthy man, employed on one line for a period of twenty-four years. About twelve months ago his engine came into collision with a goods train. The engine was broken and he was thrown off. He was a good deal shaken by this accident, though not kept from his work. Since that time he has not felt quite well, having been much troubled with what he believed to be rheumatism in the legs. During the last month he has suffered from headache, and for more than a week he has not slept well during the night.

He shivered for the first time on April 21st.

When seen on April 22nd (2nd day) his tongue was covered with a thick white coat, of a brownish colour in the centre. He had no appetite, and the bowels were confined. He complained of a pain in the forehead which made him stupid. There was no injection of the conjunctivæ, nor were the pupils contracted. On holding out his arm he was observed to tremble, though the tongue was quite steady on protrusion. His pulse was over 100 and weak.

April 24th (4th day).—He feels no better. The tremor continues. He has not slept in the night. He had a mustard poultice on the nape of the neck.

25th (5th day).—He was delirious during the night. The pulse is not so quick as it has been. The pupils are not contracted, and act well. To have 40 grains of chloral hydrate at bedtime.

26th (6th day).—He has been delirious again in the night. There is not so much tremor, but he twitches occasionally as he lies. He is perfectly sensible when talked to. The head to be shaved, a blister to the nape of the neck, and ice in a gutta-percha bag to be applied to the head. Pulse 82, temp. 100°, morning; pulse 88, temp. 100·9°, evening.

27th (7th day).—He has been very restless in the night, trying to get out of bed, &c. Now he lies with his eyes shut, and does not take notice of any one. When spoken to he answers, but soon relapses into a semi-comatose state. It is difficult to tell what he says, his speech is so thick. P. 84, T. 98·2°, morning; P. 80, T. 100·5°, evening.

28th (8th day).—The delirium was violent in the night. He speaks better to-day, and when roused out of his drowsy state he answers in a very jocular way. P. 88, T. 98·8°, morning; P. 82, T. 100·6°, evening.

29th (9th day).—Delirium continues to-day, and he talks a good deal. The bowels require to be moved by purgatives. He takes plenty of milk and beef tea, and has a glass of sherry three times a day. P. 84, T. 99·1°, morning; P. 80, T. 99·4°, evening.

30th (10th day).—Has been very restless in the night. Early in the morning he kept the left arm constantly in motion. Now the left side seems paralysed. He does not move either the arm or leg, and on opening the left eyelid no resistance is offered, while if the right is touched he winks hard. P. 88, T. 97·2°, morning; P. 80, T. 100·1°, evening.

May 1st (11th day).—Can use the left limbs. Lies perfectly quiet and cannot be roused to give any intelligent answer. His urine required to be drawn off. P. 80, T. 97·2°, morning; P. 90, T. 100·1, evening.

2nd (12th day).—He has had a quiet night, and is sensible. The right limbs lie powerless as the left did before. Catheter used. P. 84, T. 97°, morning; P. 100, T. 97·4°, evening.

3rd (13th day).—The right limbs are moved as usual to-day. He is not conscious of what takes place around him. The pupils are not contracted, and they act well under light. A large quantity of alkaline urine was drawn off. P. 100, T. 97°, morning; P. 108, T. 97·6°, evening.

4th (14th day).—The right pupil is dilated more than the left and does not answer to light. He is delirious. Urine taken by the catheter is strongly ammoniacal. Abdomen tympanitic. Had a motion by enema. P. 100, T. 96·8°, morning; P. 108, T. 96·6°, evening. He continued in a muttering delirium, at the same time moving about his arms and picking the bed clothes till one o'clock a.m., when he died without any struggle.

Post-mortem on May 7th.—The scalp was very adherent. The calvarium was translucent at the sutures, and also at one or two small pits in the bone. The dura mater was not at all adherent. The veins were greatly distended and the smaller arteries full, so that the brain looked as if injected. The blood was dark and fluid. There was slight subarachnoid effusion. A quantity of serum was seen surrounding the cord when it was divided. The fissures of Sylvius could not be exposed without tearing the parts asunder. There were some strong white bands stretching across the optic commissure. The lateral ventricles were distended with turbid serum, in which floated some opaque white masses. The nervous substance forming the floors of the ventricles was quite soft. The substance of the hemispheres was of normal consistence. The intestines were full of flatus, but otherwise normal. The spleen was of natural size and consistence. The liver and kidneys were normal.

Remarks.—I record this case with special reference to the diagnosis of meningitis.

At first the symptoms and the appearance of the patient, with the exception of the steady tongue, seemed to point to an attack of delirium tremens. The patient, however, was a temperate man, and had not been drinking.

As the case progressed the symptoms were not unlike those of typhus, and this is the disease which I should imagine there is greatest danger in mistaking for meningitis. With a view to diagnosis, therefore, I would point out the following characteristics of this case as regards the pulse and temperature.

The pulse was rapid during the first day or two. It then became slower, never rose above 90 till the twelfth day, and was only 108 on the evening before death. Such a state of the pulse, I believe, has never been recorded in typhus. On the contrary, it rises in frequency as the fever progresses, and a fatal issue is never reached without a very rapid, weak, and fluttering pulse.

With regard to the temperature, on the evening of the sixth day it was only 100·9. That one fact was sufficient, I think, to exclude the possibility of the existence of typhus. On the morning of the seventh day it had fallen to 98·2°, *i. e.* 2·7° during the night. In the evening it was 100·5°, a rise of 2·3° during the day. From this time it descended by well-marked, morning falls, with very slight evening rises, until the eleventh morning, when it reached 97·2°. On the evening of that day it was 100·1,° a rise of 2·9° during the day. Next morning it had fallen to 97°, and after this it descended till it reached 96·6°, about five hours before death.

And now, with regard to prognosis, of course the prognosis entirely depends upon the diagnosis. If we diagnose typhus in a case of this type of meningitis we prognose favorably, as the symptoms may not seem serious for a case of typhus, and the patient will take plenty of nourishment. When meningitis has been diagnosed we watch very anxiously for any fact, either of a positive or negative character, on which we can rely.

In this case from the eleventh day we had a low and descending temperature, with a pulse slowly but steadily increasing in frequency. This is a sure indication of a fatal termination, and enables us, when the general symptoms seem unchanged, to inform the friends that death is approaching.

It is believed that the temperature descends as death approaches in cases where the base of the brain is affected, whereas it rises before death when the vertex is the seat of the disease. As to the truth of such a statement, I do not know of any observations.

CASE III.—*Hepatic abscess, opening externally ; recovery.*

Mrs. T—, æt. 50, has always had very irregular bowels. As a rule she has had two or three loose motions daily, and has frequently passed blood. So far as she knows, she has never had hæmorrhoids. She is not fond of ham, pork, or sausages, and likes her food well cooked. After her marriage she had an illness, during which her skin became yellow. She has had two children, the youngest of whom is twenty years of age. During the past three years I have attended her for several attacks, beginning with great pain in the stomach and bowels, accompanied by sickness and flatulent eructations. When the sickness subsided there was great tenderness on pressure over the abdomen, diarrhœa, and increased temperature. The average duration of such attacks was about ten days. They invariably were followed by inability to stand or walk, from great weakness or apparent paralysis of the legs. She had such an attack on October 1st, 1872, which lasted till the end of the month. When apparently convalescent she again took ill on November 8th, during the menstrual period. She had repeated rigors and a high temperature, with considerable morning remissions. The sickness and pain in the abdomen continued longer than usual, and on November 15th the liver was found enlarged, and the urine contained one twentieth of albumen. On percussion the hepatic dulness reached to the left of the middle line as low as the umbilicus, from this point curving downwards and outwards through the right iliac region. Palpation distinctly revealed, within the dull area, a hard, smooth tumour, with a decided prominence at a point in the middle line, midway between the umbilicus and the ensiform cartilage. There was considerable tenderness on pressure, especially over the prominent part.

On the 19th November rigors occurred at intervals, and nothing in any quantity would remain on the stomach. The tongue was red and sore, and the bowels loose. Opium in pill was given, and a blister painted over the prominent and tender part. T. 103°, P. 120, evening.

20th.—The blister rose well, the sickness continued, and the urine contained a small quantity of albumen. T. 99·6°, morning; 100·2°, evening.

21st.—The dulness over the hepatic region remained the same, but the tenderness was not so great. T. 99°, morning; 100°, evening.

22nd.—The tenderness was greatly diminished, and the sickness had abated. Pulse 92.

25th.—The tenderness was less, and she felt much better.

27th.—The pain over the tumour was worse. Poultices were ordered. In the evening sickness began again.

28th.—There was great tenderness over the prominent part, and she was sick at intervals. One grain of opium was ordered to be taken every three hours. T. 99·2°, morning; 102·2°, evening.

29th.—The tenderness and sickness continued, with great thirst. The bowels were not moved. T. 99°, morning; 102·6°, evening.

30th.—The tenderness continued, and as the bowels had not been moved three grains of calomel were ordered.

December 1st.—The calomel moved the bowels frequently, and blood was observed in the motions.

2nd.—A blister was again applied over the prominent part in the epigastrium.

3rd.—The blister had risen well. The sickness continued. The motions were of a clay colour and contained blood. T. 102·2°, P. 124, evening.

6th.—The tenderness continued over the tumour. No blood was observed in the motions. T. 99°, P. 104, morning.

5th.—The tenderness and sickness continued. T. 98°, P. 104, morning; T. 102·2°, P. 112, evening.

7th.—The tumour in the epigastrium was more superficial, and looked as if it were pointing. This part was exquisitely tender. The motions were yellow. She was sick at night, and was able to take nothing except milk and beef tea in very small quantities. T. 102·4°, P. 120, evening.

8th.—The swelling in the epigastrium felt like a conical projection the size of an orange. The bowels were open. The sickness at night continued. T. 99°, P. 104, morning; T. 102·4°, P. 120, evening.

9th.—Poultices were ordered to the painful part. The integument over that part was œdematous. At night she was very sick, the pain was greatly increased, and for the first time she complained of throbbing in the swelling. The bowels were open. She was very thirsty. Opium was freely administered. T. 97·4°, P. 104, morning; T. 102·4°, P. 132, evening.

10th.—Percussion over the swelling, which had hitherto been dull, was tympanitic over the most prominent part. The œdematous state had disappeared, but still there was great pain. The bowels had not been moved since last report, neither had she been sick. At night the pneumatic aspirator was used. The skin over the prominent part was very thin. So soon as the puncture was made there was a forcible escape of gas of a very disagreeable odour. The needle was at once withdrawn. T. 98°, P. 104, morning; T. 102°, P. 116, evening.

11th.—She was sick about 10 p.m. yesterday, but had a quiet night afterwards. The motion this morning was very offensive. She complained of pricking in the swelling.

12th.—There was an erythematous blush extending over the swelling a couple of inches to the right of the middle line. The pain was almost unbearable. At night percussion continued tympanitic, and the skin was thinner over the prominent part. Over the lower part of the hardness, where there was no redness, crepitation was felt, as if there was air in the integument. The tenderness also had extended to this part. She was sick and had two motions. The face was flushed, and she was very thirsty. T. 102°, P. 116, evening.

13th.—She had a quiet night. The bowels acted freely in the morning. The swelling was neither so prominent nor so painful. No crepitation could be felt. In the afternoon much flatus passed per rectum, and in the evening she felt easy. Percussion was tympanitic all over the prominent part. There was more tenderness, and crepitation could be felt. P. 104, morning; T. 101·8°, P. 116, evening.

14th.—On examination there was a slight oozing with a very disagreeable smell from the puncture of the needle. It was dressed with a piece of lint soaked in carbolic lotion and covered by a sponge wrung out of the same. Over the right iliac region there was an erythematous blush, with hardness, crepitation, and great tenderness. In the evening a very offensive discharge escaped from the opening, which had become about the size of a bean. Slight pressure made a large quantity of this matter escape. The liver could now be felt large and hard, and smooth to the touch. The erythema was more marked. The bowels were twice moved by enema this morning. The motions were moulded and yellow. She was kept under the influence of opium. T. 99·6°, P. 116, morning; T. 101·2°, P. 136, evening.

15th.—The discharge from the opening continued. A considerable quantity was pressed out and the dressing reapplied. There was great tenderness and fulness on the right iliac region. T. 98·4°, P. 112, morning; T. 100·5°, P. 116, evening.

16th.—The discharge continued. The tenderness was not quite so great, and the erythema had disappeared. The bowels were moved freely and without pain. T. 98°, P. 119, morning; T. 100·2°, P. 116, evening.

17th.—The hardness on the right side continued and was connected with the opening, since by pressure upon it matter could be squeezed from the wound. The cavity was filled with carbolic lotion at each dressing. The pain was less and she was not so much troubled with sickness. T. 98°; P. 108, morning; T. 100·2°, P. 112, evening.

18th.—The discharge was of a brownish colour. The bowels were freely moved. T. 98·8°, P. 112, morning; T. 100·5°, P. 116, evening.

19th.—This morning a large fetid mass was squeezed out of the wound resembling the lining membrane of an abscess. At night the tenderness was much less, there was almost no smell, and a very little pure pus escaped from the wound. The bowels were moved freely. T. 98·4°, P. 107, morning; T. 99·2°, P. 108, evening.

20th.—She had a good night. There was a little discharge of a reddish colour, without smell. The tenderness was very slight. P. 96, morning; T. 98·4°, P. 100, evening.

21st.—There was no discharge, or tenderness, or smell, and she felt comfortable. The opium was discontinued.

23rd.—She was sitting up in bed for her meals. The bowels moved naturally every day. The wound was closing. T. 98·4°, P. 104, evening.

24th.—She had now no pain, and was feeling stronger and able to eat well.

27th.—The opening was nearly closed, the base of it being visible. She was feeling very well; the bowels kept regular, and better than they had been for some years.

31st.—The wound was healed; she had no tenderness anywhere; was eating well, and walking about her room. From this time she made rapid progress, and was soon enjoying her usual health.

Remarks.—Single large hepatic abscess in this country is rare, and recovery in such a case is uncommon. Confining my remarks to this case, without reference to hepatic abscess generally, two views may be mentioned as to its possible cause. 1. The abscess might arise from some abnormal state of the large intestine, probably of a dysenteric character. The repeated attacks of sickness, with increase of temperature, which she had previous to the illness which I have described, would on this hypothesis, be due to the same state of the intestine, though in them suppuration did not take place; and if the state of the intestine had been diagnosed as the cause of these attacks, and proper treatment adopted, the abscess might have been prevented. 2. The abscess might arise from some particular state of the liver itself, so that an apparently trifling cause, an error in diet, for example, might set up in it the inflammatory process. The latter is the view which was taken of the case, and it is probably the correct one, considering (1) that she has not had another attack of sickness since the abscess occurred, and (2) that the abscess would not be likely to improve the state of the bowels, although we may presume that it would very considerably alter the condition of the liver.

CASE IV.—*Physiological action of arsenic.*

J. G—, æt. 69, consulted me as to a troublesome eruption on the back of the head. He stated that it had been there for many years, and under medical care he had tried various applications without benefit. It was very itchy, and occasionally a watery discharge came from it.

On examination I found a patch of eruption about the size of a half-crown piece on the left side of the back of the head, beginning where the hair ends and extending upwards to a line on a level with the occipital protuberance. It was indurated and slightly elevated above the surrounding healthy skin. The surface was cracked, and there oozed out a little serous fluid. I advised that it should be painted with liquor arsenicalis.

On July 10th he took a piece of lint wet in the preparation and rubbed the affected part, using altogether not more than half a drachm. The effect of this was that the part inflamed, and became covered with vesicles. There was a good deal of swelling around, and the neighbouring glands were enlarged. At the same time his stomach was deranged, though he was not sick, and he felt very much out of sorts.

On the 20th, the part having healed and very little thickening remaining, the scalp began to itch.

On the 27th a papular, red eruption made its appearance on his head, neck, and ears, with great itching of the skin.

On the 28th, without my knowledge, he had three six-minim doses of liquor arsenicalis. The itching eruption continued to spread, and was most troublesome on the buttocks, elbows, and forearms.

On the 31st, after a restless night from intolerable itching, the face, ears, and neck were swelled and red, as if erysipelatous. He could not button his shirt round the neck. The hands, too, were swelled and covered with the same papular eruption. The tongue was covered with a white fur. The pulse was normal. Towards evening the swelling of the face subsided somewhat. The pulse was 96. He feels weak, but has no pain apart from the itching.

August 1st.—He had a tolerably quiet night. The bowels were moved by castor oil, and he remarked that the motions were of a very light yellow colour. The swelling of the face and neck has diminished, and he can button his shirt. The hands are still swelled and red; and the fingers, to him, feel as if they were raw. There is some eruption on the knees. Pulse 88.

5th.—He has improved. The eruption has faded. The skin of the face and hands, he says, has a raw feeling. On the front of the middle finger of the left hand the skin is distended by serous fluid.

8th.—He has had a restless night owing to the excessive itching. A second crop of eruption has appeared on the forearms. The skin over the whole body is scurfing.

11th.—Along the back of the forearms the skin is red and raw-looking; the redness disappears on pressure. The skin is peeling off the finger where the serous effusion was. The skin continues scurfing. He feels very weak. The eyes are now sore; the conjunctiva is red, and he can hardly look at anything. He takes food well.

12th.—His eyes are still sore; he can hardly keep them open, and complains of waterbrash.

24th.—He has continued to be troubled with the itching more or less. To-day he had a fresh outbreak on the thighs and knees, and over his hands there appeared red blotches like thumb marks.

30th.—He felt stronger, though still there was a good deal of itching. The hands are red over the backs and tender to the touch. He has noticed that when the itching troubles him it is always symmetrical, the corresponding parts on each side of the body being simultaneously affected. Thus, the two forearms on the outer aspect, the front of both thighs, or both legs, &c.

On September 4th he went to Blackpool and had a few salt baths. He returned on the 11th looking much better, though the itching occasionally troubled him. It continued to annoy him until November, and he noticed that towards the last the redness did not accompany the heat and itching. After this no trace of the eruption for which the liquor arsenicalis was applied could be detected, and his health never was better.

Remarks.—The result in this case was all that could be desired. The disease for which the arsenic was applied entirely disappeared, notwithstanding its chronicity and obstinacy to previous treatment, and the patient became stouter and heavier than he had been before. Still the action of the arsenic on the system was severe, and the patient considered the cure worse than the disease. I certainly did not expect the remedy to be followed by such a train of symptoms, and seeing that not more than a quarter of a grain of arsenious acid could possibly have entered the system by the skin, and not more than one seventh of a grain was taken by the mouth, the case seems to be particularly instructive. I had previously seen Fowler's solution painted over quite raw surfaces without bad effect; but in these cases the patients were young, and I concluded that it was because my patient was old that the action had been so severe. To show, however, that a small quantity of Fowler's solution may affect similarly a younger subject, I give the following case which has just come under my notice.

CASE V.—*Physiological action of arsenic.*

A. B—, a young lady, æt. 20, an hysterical subject, of an unusually dark, rather bronzed colour, began on September 25th to take one tablespoonful three times daily out of an eight-ounce bottle, containing sixteen minims of liquor arsenicalis and water.

On September 30th she had several fainting attacks, to which she is subject.

On October 3rd I saw her. She thought the medicine had constipated the bowels, as she had required to take a purgative, which for her was unusual. The medicine was repeated as before.

On the 7th, just a week from her last attack of fainting, she had another.

On the morning of the 8th she had a red, itching eruption on the back which was troublesome.

On the 9th her face looked as if she had had a mustard poultice on it, being red, swollen, and itching.

I saw her on the 12th. The itching continued on her body, and was worse when warm in bed. On examining her face I found a red papular eruption on the left cheek and round by the ear, exactly similar to what I had long watched in Case 4. It did not cover the whole surface of the skin, and was not unlike the eruption in measles. When the eruption began she had probably not taken more than twenty-four minims of liquor arsenicalis, and when I saw her on October 12th she had still one dose left of the second bottle which I had given her to take.

I have not seen her again; but her case, with Case 4, proves that a very small quantity of liquor arsenicalis, say half a drachm in divided doses, may produce the physiological effects of arsenic. The physiological effect produced in these two cases is, so far as I know, uncommon.

Treatment in Case 4 seemed of no avail, the greatest relief being obtained by enveloping the affected parts in wet cloths.

The experience of these two cases, tends to make one question the wisdom of quoting the dose of liquor arsenicalis, as from two to eight minims, which is done in the 'British Pharmacopœia.'

CASE VI.—*Rupture of the vaginal wall during coitus.*

I was sent for one night to see a woman said to be flooding, and found her on a couch, her clothes saturated with blood, and a large quantity lying about her in clots.

She said she had been married and had a family, but her husband had been dead some years.

Examining per vaginam I found a sharp, well-defined margin at the posterior part of the vaginal wall, inside of which there was a mass of clotted blood. At first I thought the sharp margin was the posterior lip of an enlarged uterus full of blood, and at once proceeded to evacuate the clot. Having got away all the clot, I came upon the cervix uteri, small and unaffected, but found behind the cervix a cavity with a ragged surface, as if the vaginal wall had been torn by some blunt instrument. There was considerable bleeding from the lacerated cavity, which was stopped by plugging with a silk handkerchief. On inquiring as to the cause of what I had found, I was told she had tumbled down stairs and began to flood. She, however, assured me she had not fallen on anything that could penetrate the vagina, and, in fact, did not know that she had been hurt. Feeling confident that such a cause would not produce the effect, and being anxious to fathom such an obscure case, I at last elicited the truth, viz. that during coitus with one whom she had not previously known he hurt her severely and left her in a pool of blood.

Any remark on this case is uncalled for; still it may be interesting medico-legally.

ON OVARIOTOMY AND EXPLORATORY INCISION IN CERTAIN CASES OF OVARIAN DISEASE.

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In the 'Lancet' for May 2nd, 1874, appeared a clinical essay by Mr. Pridgin Teale, entitled "Ovariotomy in Extremis," and the views there enunciated by him suggested to me that they were capable of wider extension.

Mr. Teale's object was to show that in certain cases of ovarian disease, even when the patient was almost moribund owing to the supervention of a critical change in the local conditions, *e.g.* rupture of the cyst into the peritoneal cavity, acute suppuration of the cyst or peritoneum, &c., an operation might be undertaken with a possibly successful result, and he gives cases in his own practice which seem to prove the correctness of his views, one patient in particular being rescued from the very jaws of death by immediate operation after acute suppuration of the cyst following tapping had occurred.

Mr. Teale having satisfactorily proved his views to be correct in this particular respect, I pass on to consider whether there are not other cases of ovarian disease where the urgency is not so great, and yet where an operation is equally desirable although not generally practised.

Ovariotomists are wont to speak of cases as "favourable" or "unfavourable" for operation according to the absence or presence of certain local complications, *e.g.* extensive adhesions, large size of tumours, &c., and here we notice a considerable discrepancy in the practice of different men, some being anxious to show a large percentage of recoveries, and therefore rejecting all cases in which the complication is likely to entail an unfavorable result, whilst others are ready to operate on almost every case which comes in their way, and even on cases which have been rejected by other surgeons, as in the case operated on by Graham, of Liverpool, which had been refused by Keith and Spencer Wells on account of extensive pelvic adhesions, and which proved successful, the diagnosis being also shown to be correct.

It is obvious that the mortality returns of the two classes of practitioners will differ widely, but my wish is to show that within reasonable limits many so-called "unfavourable" or doubtful cases may be subjected to an exploratory incision with a view to determine whether a tumour or cyst can be removed with a fair chance of a successful result, and that, if the complete removal be not achieved, at any rate in some cases such relief may ensue as to give the patient much ease and perhaps many months or possibly years of life. Let me say that by an exploratory incision I do not mean that it should take the place of patient and repeated digital examination of the abdomen in the usual manner, but as a *dernier ressort* to complete an uncertain diagnosis *when all other means have failed.*

Even in the most skilful hands diagnosis can only be approximate, and, to use the words of the most experienced ovariotomist of the day, "It is no reproach to the surgeon if, acknowledging doubt, he endeavours to clear up that doubt by an exploratory incision." Such cases will probably become rarer as diagnosis becomes more perfected.

The experience of ovariotomy shows that it is by no means an absolute rule that cases which, owing to their freedom from local complications, seem in the first instance most favorable, really do the best after operation. Do we not see cases of, perhaps, unilocular cysts of slow growth, without adhesions, which can be drawn out through a small incision without exposure of intestines or extravasation of fluid into the peritoneum, and other conditions, such as the constitution of the patient being satisfactory? Yet the case so-called "favourable" rapidly terminates fatally, whilst in a case originally designated "unfavorable," and perhaps only operated at the determined wish of the patient, the tumour more or less solid and requiring a long incision with considerable adhesions, portion of the cyst-wall being possibly left attached of necessity, and generally in such cases prolonged exposure of the abdominal viscera and frequent sponging-out of the peritoneal cavity, yet such a case will sometimes progress without a bad symptom.

The occasional occurrence of such proves, I think, firstly, that cases should not be too readily rejected as unsuitable or unfavorable; secondly, that it is quite justifiable, and, indeed, good practice in some, to make a limited incision to determine the exact nature of a tumour and its complications *when all other means to attain the same end have been tried,* and I venture to think that this might be done more frequently than it is at present.

The occasional saving of a life which would otherwise be lost will go far towards counter-balancing the objection which might be made to the proceeding, viz. that by it we hasten on the fatal termination of the case, which, if let alone, would drag on a painful or weary existence for some months longer.

That lives are sometimes (though rarely, perhaps) saved is proved by Mr. Teale, and I cannot do better than quote his own words when speaking of his cases.

"The experience of these cases and of a few others of a like kind which have been reported is extremely encouraging, and teaches us that in conditions apparently hopeless the surgeon can hardly be justified in refusing the patient the chance afforded by ovariotomy, *provided that the danger results from conditions affecting the tumour or peritoneum, and not* from disease of heart or lungs or other vital organ. Had this principle been established in the early days of ovariotomy, it is likely that lives might have been saved in cases where simple tapping has proved fatal."

The following cases help to prove the view put forward:

CASE 1 (Teale).—Acute suppuration of ovarian cyst after tapping (with the pneumatic aspirator, it may be noted). Incision from sternum to pubes. Peritoneum red and coated with recent lymph. Cyst containing fœtid gas and stinking purulent fluid. In one place cyst-wall gangrenous. Numerous recent adhesions to abdominal wall and intestines which were broken down by hand. Pedicle tied with whip-cord and returned.

Patient "went on most satisfactorily, got up on the 17th day and was discharged cured at the end of a month."—'Lancet,' June 28th, 1873.

CASE 2 (Teale).—Cyst full of pus, firmly and universally adherent to the abdominal wall in front and to the intestines and uterus behind. Whether ovarian or not could not be satisfactorily determined, as there was no pedicle. During the separation from its adhesions the patient became so exhausted from the hæmorrhage, which went on freely, that death on the operating-table was feared. A portion of the cyst-wall was therefore left adherent and the wound closed "as a matter of form, so great and hopeless seemed the exhaustion." She recovered, however, and for some time had a discharge of pus and fœtid gas from the wound.—'Lancet,' May 2nd, 1874.

CASE 3.—Keith has reported a case in which he successfully operated for removal of an ovarian cyst which had suppurated after tapping. Both cyst and peritoneum were inflamed; in fact, the tumour was in a condition of incipient gangrene. Intestines distended; coats thickened, of a dark cherry-red colour, adherent to one another by freshly effused lymph and in a high state of inflammation. Operation lasted two hours. Bleeding profuse. Improvement almost immediate. In three weeks patient out of bed.—'Lancet,' 1865, vol. i, p. 36.

CASE 4.—Tracey, of Melbourne, operated successfully during acute peritonitis with suppuration of an ovarian cyst. Patient, æt. 31, hectic; temperature 102°; pulse 120; and all symptoms of diffuse peritonitis. He removed a multilocular, semisolid ovarian tumour, almost universally adherent. The peritoneum deeply congested, much thickened, and full of flaky lymph, which was scooped out in large quantities. After operation a rapid subsidence in temperature, and recovery was speedy and complete.—'Trans. Med.-Chir. Soc.,' 1873, p. 84.

CASE 5.—Spencer Wells operated on a case where the cyst had ruptured and peritonitis resulted from extravasation. Patient, æt. 36, in the fourth month of pregnancy. Symptoms chiefly pain, tenderness, raised temperature, rapid pulse, dry tongue, and sickness. General injection of the peritoneum, no recent lymph, but some omental adhesions. Mr. Wells was extremely careful to cleanse the peritoneal cavity thoroughly by repeated sponging, carrying out his view that "much more risk is incurred by inefficient removal of extravasated or effused fluids than by the careful sponging-out of the abdomen, even though the operation is thereby much prolonged."

This case is reported in the 'Lancet,' 1866, vol. ii, p. 400. It is, perhaps, only right to say that Teale had one unfavorable case where the cyst ruptured, the contents extravasated causing acute peritonitis. The sac was found adherent to viscera and abdominal parietes, and was removed. The patient went on well until the 5th day, when the peritonitis set in with renewed vigour, and terminated on the 6th day.

CASE 6.—Dr. Wiltshire and Dr. Watson have published a case of a woman who was dying from bleeding into an ovarian cyst. Ovariotomy was immediately performed, and the patient was saved.

Spencer Wells was sent for twice to operate under similar circumstances, but the patients were dead before his arrival.

I may mention a case of my own here in which I very much regret I did not propose the operation.

On April 13th, 1875, at the request of Dr. Walby, I saw Mrs. C—, æt. 24, who had ovarian dropsy of about twelve months' duration. The walls of the abdomen were enormously distended and extremely tense, and a slight blush over the lower part of the abdomen. The swelling was uniformly fluctuating; no solid matter could be detected. The lower ribs were much bulged out, and dyspnœa much complained of, with an irritating cough. Patient was much emaciated, but the family history good. Lungs sound; also heart, but a quick, weak pulse. Girth of abdomen at umbilicus fifty-three inches. It was agreed to tap at once, try to improve the general health by tonics, and then consider the question of ovariotomy.

April 14th.—Paracentesis. Forty-seven pints of barley-water fluid evacuated; the last pint which drained off, however, consisted of pure pus and flocculent shreds of lymph undergoing purulent transformation. Much relief was experienced from the tapping, but on the 15th symptoms of inflammation of the cyst came on, the abdomen enlarged very rapidly and was very tender, and semi-purulent fluid commenced to pass in considerable quantity per rectum.

On the 16th, at the wish of her friends, she was removed to the Northern Hospital under Dr. Graham's care.

She died on the 19th.

Dr. Barr, house-surgeon, kindly sent me notes of the post-mortem. The cyst was unilocular and free, except some trifling recent adhesions to the peritoneum and intestines and at one point to the descending colon, between which and the cyst was a small opening, thus forming a communication. The cyst contained several gallons of extremely fœtid, dirty-brown, semi-purulent fluid. All the other viscera were healthy.

Were a similar case to occur to me, I should certainly advise the operation when the symptoms come indicating inflammation of the cyst, and I see no reason why, if this had been done prior to her removal to hospital, the result might not have been as satisfactory as in Mr. Teale's cases.

A case occurred to me of exploratory incision a short time since which I feel bound to mention because it was unfavorable in its results; and as it would seem at first sight to militate against the treatment proposed, it might appear a want of candour not to relate it.

Miss E. M—, æt. 46, had a large abdominal tumour of semisolid, somewhat fluctuating consistence, which had been three years in growing. She was extremely anxious to have it removed, and was not satisfied because it had been refused at a county hospital on account of supposed malignancy. The evidence obtained by examination pointed to its being either an ovarian or a pedunculated uterine fibroid. There were no special symptoms of malignancy. The patient was much emaciated, but the family history was good. All the organs were healthy, except a little dulness over the apex of the left lung.

Dr. Grimsdale, Mr. Hakes, Mr. Denton, and Drs. Wilson and Skinner saw her and agreed in the diagnosis, and also that the case was an unfavorable one for operation. As the patient was suffering so much from the mechanical inconveniences, she implored that something might be done and I agreed to attempt its removal with the concurrence of the gentlemen named, who together with myself pointed out the danger she would run. She was determined, and on June 24th, 1875, Mr. Hakes, Mr. Denton, Drs. Wilson, Fenton, and Skinner being present, I made an incision from the umbilicus to the pubes. The parieties of the abdomen were extremely vascular and required many ligatures; some of the vessels were of large size. No distinction could be made betwixt the peritoneum and the tumour, so the incision was enlarged upwards to find a spot where they were separable. Some large veins were here divided with very copious hæmorrhage, which was troublesome to stop. The patient became very much exhausted after the tumour had been separated from the anterior wall of the abdomen; and as the pulse was failing, I judged it best, with the concurrence of those present, to proceed no further, as the removal of the tumour might probably be such a shock that she would die before the completion of the operation. She died in six hours.

Post-mortem examination showed that the tumour was not malignant, but fibro-cystic, attached to the fundus of the uterus by a narrow, thin pedicle and by an adhesion to the left broad ligament; it weighed 29½ pounds. Both ovaries were healthy. No intestinal adhesions were present. The omentum was found to have spread out between the tumour and anterior wall of the abdomen, matting them together. Its veins, which were much dilated, were the source of the hæmorrhage.

I do not think this case in any degree forbids an exploratory incision, for the hæmorrhage was an unexpected occurrence and could not possibly have been foreseen. If the patient had not become so suddenly exhausted, and so have stood the shock of the removal, she might very possibly have rallied and recovered; and it was one of those cases where life was a burden, as expressed by the patient herself, and its duration probably very short if the disease was left alone.

It is curious to notice how much prejudice existed in the early days of ovariotomy. I suppose few would now endorse the opinion of Mr. Safford Lee (with whom Churchill states that he agrees, 'Diseases of Women,' 1850, p. 396)—"In the majority of cases which come under our notice it is my opinion that the operation of ovariotomy is unjustifiable;" and writing about the same period, Meigs, in his translation of M. Colombat's work, adds the following note, p. 415:—"I fully agree with the author (M. Colombat) in his disapprobation of operations for the extirpation of the diseased ovary, and I am free to say that I look upon the operation as not to be justified by the most fortunate issue in any ratio whatever of the cases."

Owing to the perfection of diagnosis and mode of operating, these opinions have given way, and ovariotomy has taken its place amongst the legitimate and satisfactory operations of surgery. But may not there be many cases where, although the danger is not so immediate as in the cases cited above, yet the patient is equally "in extremis," as Mr. Teale would say, *i. e.* when death from pain and exhaustion is not far distant if the patient is not relieved, and which are at present rejected as unsuitable for operation, owing either to uncertainty regarding the character of the tumour, or because the possibility of its removal being effected with a fair chance of success is doubtful. It is in such that I would advocate the more frequent adoption of a careful "exploratory incision." It happens sometimes that in the hands of experienced ovariotomists complications are found which were not previously suspected, and occasionally the operator is gratified to find a case much more favourable than he had considered it before he made his incision. The latter occurrence seems to me a plea for clearing up doubtful cases by the incision. We gain valuable information as to the results of such cases from Mr. Spencer Wells' work. He completed the operation of ovariotomy in 500 cases with a mortality of 128, or about 1 in 4. In 28 other cases he commenced the operation, but found it impossible to complete it; and in 28 other cases exploratory incisions were needful to complete the diagnosis.

In the 28 incomplete operations 15 deaths occurred in periods varying from fourteen hours to twenty days—a mortality of 58·6 per cent. or rather more than 1 in 2. In several of the cases of recovery from the incision, although the disease was not extirpated completely, a partial cure was effected, prolonging probably the patient's life, and certainly rendering it more bearable. A complete cure seems to have been effected in one case by opening an adherent and non-removable cyst and allowing it to suppurate, for we find the patient alive seven years after. In another, which was operated on in August, 1868, for ruptured cyst and extravasation into the peritoneal cavity, the tumour was not removed owing to its extensive adhesions, but the peritoneal cavity was cleared out. In January, 1869, she was "gaining flesh and improving in health." She was tapped twice after the operation, and drainage of pus from the suppurating cyst took place.

In another case an adherent and non-removable cyst was emptied and attached to the lips of the wound and allowed to suppurate; the patient was in good health six months after, with a daily discharge of a few drops of pus.

She died four years after the operation after re-formation of the fluid and tapping.

Whilst the proportion of deaths, 15 in 28 cases, seems large, it should be remembered that in most the tumour or its complications were such as to render speedy death inevitable if not relieved by operation. The amount of relief given in the cases which did survive the operation far outbalances the high mortality; at least, I think this will be conceded.

In the 24 cases of exploratory incision we find 7 deaths, or a mortality of 29 per cent., which may be referable to the operation, although the condition of the tumour was of such a nature as to involve early death if not interfered with, *e. g.* in one case being "apparently cancerous and involving both ovaries and the uterus."

Another patient was moribund with dyspnœa and anasarca—"relieved by operation and died two months after." In another case the cyst ruptured spontaneously, and the fluid was removed from the peritoneal cavity. This condition would have involved speedy death if something had not been done, but as the result of the operation we find "she recovered and was tapped several times before she died." In some cases the disease, although proved by the exploratory incision not to be ovarian, was cured or relieved by the operation. Thus, there were four cases of renal cysts which were exposed and tapped; two died, and in the other two recovery was permanent and complete. One of the patients married in two years after the operation, and in a year after bore a child. In another case, although not permanently cured, the patient was "as much or more relieved than by a simple tapping." Mr. Spencer Wells says—"Occasionally, after commencing by an exploratory incision, I have found it possible to remove an ovarian tumour, but there has always been some peculiarity which led to this unusually cautious mode of proceeding."

To sum up, I think we may fairly conclude—

First.—That whilst many cases of ovarian disease can be diagnosed exactly, and the advisability or otherwise of operation being performed decided, there are occasionally cases which are uncertain in spite of the most skilful examination, and the experience of first-rate operators has shown that an exploratory incision is not only justifiable, but necessary, and the treatment has often resulted beneficially either as regards a partial or complete cure.

Second.—That ovariotomy is occasionally necessary to save a patient from impending death; and that, although the mortality in this class as well as the preceding seems high, it cannot fairly be said in many of the cases to kill the patient, but to fail to save life which would eventually be lost without the operation; and that cases have been cured occasionally for which there was no other possible chance; also that others, although not cured, have been very much relieved. I cannot help thinking the time will come when the danger of opening the peritoneal cavity will be less feared than at present, and that the surgeons of the future will operate in many conditions of peril caused by injury or disease of the abdominal organs—such cases as obstruction of the intestine from bands or intussusception, wounds of the intestines from stabs, extra-uterine fœtation; in fact, in conditions which are now admitted to be hopeless unless submitted to operation, and in cases of chronic peritonitis and effusion of fluids after ovariotomy, it will, I think, become the universal practice to open the abdomen and clean out the peritoneal cavity, probably using disinfectant applications after the manner suggested and practised by Peaslee ('Ovarian Tumours,' p. 509).

ON FAMILY PREDISPOSITION IN LOCOMOTOR ATAXY.

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CASES in which several members of the same family are affected with locomotor ataxy are of such extreme rarity that the following instance may, I think, well deserve to be recorded:

In a family consisting of fifteen children five were affected with locomotor ataxy (three brothers and two sisters). The father of the family, aged 72, is still alive and healthy; the mother died at the age of 54 of bronchitis. Of the ten children not affected with ataxy seven are dead; of these three died when 2-3 years old of measles, one died at 14 in consequence of an injury, one died at 36 of some chest-affection, and two died at the age of 27 of an acute disease of only one week's duration, characterised by delirium and fever, and pronounced by the medical man to be brain-fever. The three which are alive are strong and healthy; two of them are married and have healthy children.

Of the five children affected with ataxy two are dead and three alive. Concerning the two which are dead I received the following statement from the father of the family:

Mrs. Mary D— died two years ago, æt. 42; she married at twenty, began to be affected when twenty-one, her symptoms corresponding in all points to those observed in the other cases to be detailed (particularly that of James B—). The last three years of her life she was quite paralysed, both arms and legs being affected. She has left three children, all strong and healthy.

Mr. Samuel B— died, æt. 21. He had been affected for the last two years of his life; he could walk well with the help of a stick, and his arms were not at all affected. His death was caused by an intercurrent attack of typhoid fever.

The remaining three members of the family I had an opportunity of seeing myself, and the following is a brief description of their symptoms at the present time:

Mr. James B—, æt. 42, has been married for the last fifteen years, and has three healthy children, aged fourteen, twelve, and nine years respectively. When a child he was perfectly well. Had typhoid fever when eighteen. When twenty his present ailment first showed itself; he felt a weakness in thighs and legs, especially on walking; he could, however, walk long distances on a level road without great fatigue; he could not walk in the dark at all, for on doing so he staggered and his legs gave way from under him; he experienced also at that time very sharp lancinating pain, especially at night, in both legs and feet; his health in other respects remained good. For a number of years he could walk well with the help of a stick, but now he experiences great difficulty in walking, even with the help of two sticks. Two years ago he first noticed a weakness in both arms, which up to then had not been affected; this weakness has gradually increased, and he is now unable to execute any finer movements with his arms or to grasp anything.

Present condition.—Looks well and robust. The muscles, especially those of thigh, feel flabby, but there is no muscular atrophy whatever. Eyesight very good; fundus of eye normal; no oculo-motor troubles. Speech not affected; hearing good; the examination of chest and abdominal organs reveals nothing abnormal; his appetite very good, no epigastric pains; bladder and rectum not affected; no diminution of sexual power.

Upper extremities. The outlines of the limb show no alteration; there is no atrophy of the muscles; the muscles of arm and shoulder feel flabby. Patient is able to execute any movement with his arms, whether eyes shut or open; the movements are executed without any inco-ordination; the grasp of his hand is very weak and hardly appreciable by the dynamometer. The electro-muscular sensibility and contractility are intact; there is no loss of cutaneous sensibility; he feels the prick of a pin, and appreciates different temperatures.

Lower extremities. The state of the muscles and the different sensations are the same as for the arms, except that the cutaneous sensibility is much diminished, especially on feet and legs.

In the recumbent posture he is able to execute any movement with his legs, though these movements are slow and somewhat jerking, and become much more so when eyes are shut; the muscular power in the legs is considerably diminished, and he very unsuccessfully resists an attempt to flex the extended leg; with his eyes closed forgets often the relative position of his legs.

In the erect posture the patient is very helpless; he can only stand with the help of two sticks, and even then the upper part of body is bent forward; at times he is able to stand without the help of sticks, and then totters immediately on shutting the eyes.

When walking the upper part of body is bent forward; the feet, but slightly raised from the ground, are slowly dragged forward in a semicircle; the foot is then planted on the floor, the heel always coming down first. He is unable to walk without his sticks; his walk with the eyes shut could therefore not be examined. He is unable to get up steps by himself, not being able to raise the foot.

When assuming the erect from the sitting posture the body is suddenly jerked forwards and upwards, and only after considerable staggering is the patient able to steady himself by help of his sticks.

Mr. John B—, æt. 32, single, enjoyed good health up to his twenty-third year, when he began to experience a feeling of weakness in his knees, and at times excruciating pains in his thighs and legs, especially at night; his eyesight at the same time became very bad, but has since then improved. He could walk well until two years ago; since then has got worse, and now requires a stick. Lately he has felt pain in his knees, and also a numbness in his legs after standing for a long time, which passes away on sitting down. Has no pain when walking, but experiences great difficulty when walking in the dark.

The sexual power and desire have gradually disappeared without any spermatorrhœa; all the other functions are normal, and have never been disturbed.

Present state.—Patient is of small stature, thin and pale, and has quite a boyish look about him.

Muscles of face a little atrophied; no oculo-motor troubles; fundus of eye normal; no affection of speech; physical examination of chest and abdomen shows nothing abnormal.

Upper extremities. The muscles are flabby and atrophied, the right more than the left, the atrophy being especially well marked about the muscles of thumb and those of forearm; the muscles of upper arm show but little atrophy; he is able to execute any movement with his arms well and readily, both with his eyes open and shut; the grasp of his hand is very weak; measured with the dynamometer the left corresponds to ten kilogrammes, the right to five kilogrammes. There is no inco-ordination in the movements of his arms and no loss of tactile sensibility; the electro-muscular contractility is much diminished.

Lower extremities. The muscles show considerable atrophy, the right more than the left; of all the muscles the gastrocnemii are most affected, in consequence of which the knees come very much forward. Cutaneous sensibility seems intact, but the electro-muscular sensibility and contractility are very much diminished.

In the recumbent posture he is able to execute any movements with his legs very readily and without much inco-ordination; with his eyes shut there is, however, a good deal of inco-ordination in his movements. He can well define any point of his body touched with his eyes shut or open.

When sitting he is unable to raise himself without a stick or assistant, and only gains his equilibrium after a good deal of staggering; in trying to sit down he comes down with a sudden jerk.

He is unable to stand with his feet close together, whether eyes shut or open. He walks tolerably well without any help, throwing his legs and feet outward, and bringing the heel down with a stamp. On turning round he staggers, likewise when trying to walk with his eyes shut, though not to such an extent as it is observed in most ataxic patients.

Mrs. Martha C—, æt. 34, married, has three healthy children. Her ailment commenced when she was twenty; she experienced sharp, cramplike pains in her thighs and feet, and noticed also a heaviness in her walk, especially at night in the dark. She remarked at the same time that when walking her legs gave way from under her as soon as she had her attention drawn away; she could, however, walk long distances. She often felt, on walking, as if the floor would give way, and often felt as if she were walking in felt boots; for the last three years she has felt her legs go weaker, but she can yet walk considerable distances on a level road, and does not get so soon fatigued on standing for a length of time. In every other respect she always felt well, and at the time of my visit she was in her eighth month of pregnancy.

Present condition.—Patient looks very robust and healthy; there is nothing abnormal about head, face, and upper extremities. The eyesight is very good; the speech is not affected. The upper extremities are, both as regards sensibility and mobility, quite normal. The lower extremities only are affected. There is no atrophy, but the muscles of thigh are a little flabby; there is considerable muscular power in the legs, and great resistance is experienced in trying to flex the extended leg; the cutaneous sensibility is slightly diminished. The walk of the patient is like that of an ataxic; she is able to walk without a stick, but the movements show inco-ordination; the foot on walking is lifted from the ground, and the heel comes down first; she is quite unable to walk with her eyes shut; when changing the sitting for the erect posture, and *vice versâ*, the ataxic symptoms become very characteristic.

There can be little doubt, I think, that the cases above described are cases of locomotor ataxy, and that the difference in the symptoms observed in the three cases briefly described is due to the duration and the peculiar mode of extension of the disease.

In the first case the ataxy has, to a great extent, disappeared, and given place to a paraplegic condition. Such is not an uncommon occurrence, and a case observed by Topinard (‘L’Ataxie Locomotrice,’ p. 266) is particularly instructive on this point, for here the ataxic symptoms lasted for several years, and were then superseded by paralytic symptoms; the patient now improved for a time under treatment, and as the result the paralytic symptoms abated and the ataxic symptoms again made their appearance. Topinard cites many other cases where, with the advent of the paralytic symptoms, the ataxic symptoms diminished, and according to recent researches (‘Charcot, ‘Leçons sur les Maladies du Système Nerveux,’ 2e sér., fasc. 1, p. 14) we have in all such cases an extension of the pathological process from the posterior columns to the lateral columns.

In the second case, that of John B—, the ataxy is associated, not with paralysis, but with marked muscular atrophy. This, though not a common complication, is by no means so rare as it is generally supposed. Cases of this description are given by Trousseau, Topinard, &c. The disease in these cases seems to extend from the posterior columns to the large motor ganglia in the anterior horns of the cord, as a case observed and thoroughly examined by Pierret ('Archiv. de Physiolog.,' 1870) distinctly showed.

In the last case described (that of Mrs. Martha C—) the disease is evidently still limited to the posterior columns, and hence this case corresponds more closely to the ordinary cases of locomotor ataxy. Now, as the other two cases began in the same way, we have in this case a still further proof that the other two cases (that of James and John B—) are really cases of locomotor ataxy, and not, as one might at first glance suppose, cases of chronic myelitis and progressive muscular atrophy respectively.

The cases related above presented, besides, other peculiarities. In all of them I noticed the absence of ocular troubles. The six cases observed by Friedreich, to be immediately quoted, presented the same peculiarity, and according to Topinard (l. c., p. 150) the ocular troubles are absent in about half the number of cases of ataxy.

In only one of my cases a diminution of the sexual powers was noticed; in the case of James B— there existed for a time priapism, but now his sexual powers are as strong as ever, while the subject of Case III was pregnant at the time of my visit.

The only other cases on record which I could find, where several members of the same family were attacked by locomotor ataxy, are two cases given by Friedreich ('Virch. Arch.,' vols. 26 and 27), and one by Carré ('De l'Ataxie Locomotrice Progressive,' Thèse de Paris, 1862).

In Friedreich's first case one brother and three sisters were affected. In all of them the affection began between the fifteenth and eighteenth year, and was characterised nearly throughout by ataxy and paralysis without any ocular troubles. Two of the four died from an attack of typhoid fever, and the examination of the spinal cord showed degenerative changes in the posterior columns and roots, and the presence of many corpora amylacia.

The second case of Friedreich concerns a brother and a sister. Here again the process began at 15, and, as in our cases, was accompanied by paralysis and atrophy; there was also absence of ocular trouble; the speech, however, was considerably affected.

Carré (l. c.) describes an ataxic patient, æt. 26 (where the disease had existed for five years, and where ocular troubles were likewise absent), who related to him that seventeen other members of her family were similarly affected, namely, her grandmother, her mother, all her relations on the mother's side (seven in number), seven of her brothers and sisters, and one cousin.

Cases where one member of the family is affected with locomotor ataxy, while different members are suffering from other nervous affections, such as epilepsy, hysteria, paralysis, mental diseases, &c., have frequently been observed, and an account of some of the best-observed will be found in Topinard (l. c., p. 368).

SCRAPS FROM A G. P.'S CASE-BOOK.

By P. M. BRAIDWOOD, M.D., BIRKENHEAD.

The following narrations of cases with remarks appended are intended to dispel the idea that all, or even most, general practitioners are creatures who follow their profession as a trade, treat diseases empirically only, nor read and reflect on the results reached by fellow-workers in medicine. On the contrary, most of them are thoroughly versant, with the latest theories propounded in pathology or the newest therapeutical measures published, while when driving, riding, or walking they reflect on the last clinical observation they have made, and, weighing truly and correctly its value, they adopt or reject it as further experience teaches them. Moreover, general practitioners have an infinite advantage over the medical officers attached to hospitals, inasmuch as they can obtain fuller and more accurate statements from their patients regarding family history, duration of symptoms, &c.; they for the most part are consulted at an earlier stage of disease, and, from having known and watched over their patients during many years, they can observe most accurately variations due to constitutional causes, and can detect most precisely the influence of hygienic and dietetic means.

Four Cases of Diabetes.

These four patients illustrate well two points of practical interest, the apparent absence of pathological lesions detectable after death with the naked eye and certain data which it is of great importance to bear in mind when forming a prognosis.

Mrs. S—, æt. 26, had been suffering from diabetic symptoms probably for six months before she consulted me. About the date from which she reckoned the commencement of her illness she lost her first-born, only two and a half weeks old, the cause of the infant's death being a very severe attack of icterus. The question naturally occurs, Could the icterus have been developed by the glycosurial changes affecting the mother when pregnant? I am inclined to think this was probably the case, as the post-mortem of the mother revealed amyloid degeneration of the hepatic tissue. Mrs. S—'s parents and the other members of her family are healthy and long-lived, with the exception of a brother who is in an asylum, suffering from chronic "mania." She herself appears to have enjoyed excellent health prior to her marriage. Her symptoms clearly indicated diabetes mellitus. She was losing flesh rapidly, was very thirsty, passed large quantities of urine (three to four quarts in twenty-four hours), ate heartily, but not ravenously, was easily fatigued, with a dry skin, red, glazed tongue, and constipated bowels. Her urine on examination revealed a large amount of sugar, and had a sp. gr. of 1040 to 1045. Regarding the influence of the remedies used, it was observed that opium alone affected the excretion of sugar and the diuresis; as Sir Thos. Watson expresses the value of opium in diabetes mellitus, "it is a treasure to us in this disorder." But Mrs. S— was under my care for this complaint only during the two months preceding her death, so that neither dietetic régime nor the medicines chiefly recommended for diabetes were found to have more than a transitory influence over the progress of the disease. The amount of sugar as well as the quantity of urine varied somewhat, but not materially. Her general health seemed to be better on some days than on others, and she expressed herself as "feeling to be getting better." She was able to attend to her household duties and to go out daily. She collapsed within twenty-four hours.

The autopsy forms the most interesting portion of this sad case. When the body was examined, thirty-four hours after death, it was found to be extremely emaciated. The entire venous system was greatly engorged. The thoracic viscera appeared healthy, except that the cardiac walls were thin and flabby. The liver was congested and showed amyloid degeneration. The kidneys, especially the veins of their cortical substance, were congested, but their tubular substance appeared healthy. On opening the cranium the veins of the dura mater were found loaded with dark fluid blood. There was an excess of serum in the arachnoid and ventricular cavities. At the base, below the iter a tertio ad quartum ventriculum, was observed a growth of the size of a split pea.

CASE 2.—Mr. —, aged about 58, has been married twenty-four years, and has had eight children. He states that though he eats, sleeps, and feels well, he is becoming thinner, and this he has observed during the past twelve months. His mother, aged eighty-five, suffers from cerebral softening; and his father died many years ago. He complains of no great thirst, passes a considerable amount of urine (about three quarts in twenty-four hours), and does not perspire, but his skin is by no means dry and harsh. For some years prior to his consulting me about his diabetic state he had received advice from me for "biliousness," and about two years ago he appealed to me on account of a severe pain in his right heel which prevented his walking much. When he first consulted me for diabetes his urine had a sp. gr. of 1025, and sugar was very readily detected by Moore's and Trommer's tests. After taking Fer. et. Quin. Lactat. 10 grs. ter in die, with opium 2 grs. in pill night and morning, for three days, the amount of urine excreted fell to two quarts during twenty-four hours. The amount of sugar reckoned at this time was four and a half grains per ounce. As the bowels were very constipated, one pill and two powders were prescribed to be taken daily, and under this treatment the amount of sugar excreted was reduced to 3·69 grs. per ounce of urine. Dr. Pavy's dietary was at the same time followed pretty closely, and gluten bread used for the most part. In twelve days later it is recorded that the sp. gr. of the urine was 1015, no sugar detectable, but a large excess of urea and uric acid, and the average amount passed daily was two quarts. The powders have been taken regularly, but no opium for ten days past. He feels very well, and has lost the uncomfortable itching of the skin. He takes a great deal of walking exercise and dumb-bells in the morning. A week later the urine showed 2·40 grains per ounce. In six weeks later the sp. gr. was 1007; there was no trace of sugar, and the patient thought he was gaining flesh. He takes no medicine, but adheres to Pavy's dietary; complains of a burning pain and uneasiness in the epigastrium. At the end of another month there was found a trace of sugar, owing probably to his not adhering strictly to the anti-diabetic dietary. He was at this date prescribed two grains of codeia in pill at bed-time, and to resume Pavy's dietary. Two weeks after this date the sp. gr. had increased to 1025, and there was a considerable amount of sugar in the urine. Six weeks later it is recorded that the patient has been taking two opium pills daily since last report. He perspires comfortably. Has free desquamation of the cuticle. He has also observed that, when the diabetic symptoms are aggravated, the space on the dorsum of his left hand between the fore and middle fingers swells and is painful. The urine contains a trace of sugar too small to estimate and an excess of uric acid. Since the last date, now more than a year ago, the patient has been steadily improving. He feels well in himself, is not readily fatigued, has pleasure in attending to his business, and is gaining in weight. The urine, even when tested by the fermentation process, shows scarcely a trace of sugar. He adheres to Pavy's dietary, and during the last six months he has been taking, almost without cessation, codeia twice or thrice daily in gradually increasing doses, commencing, as Dr. Pavy recommends, with ¼ grain, then ⅓, ½, ⅔, &c. The only additional treatment has been the occasional application of the Tr. Iodin. Co. over the hepatic region at bedtime.

Case 3.—Mr. W—, æt. about 54, the father of a large family, consulted me nearly a year ago for diabetes mellitus. His greatest weight had been 240 lbs., but he averaged fifteen stone till a few years ago. During the last two years he has lost a couple of stone in weight, and thirty pounds during the last three months. His brothers each weighed fifteen stone; his family history is excellent. He suffered very severely from rheumatic fever twenty-two years ago, and says he had very severe "general congestion" twelve years ago. He has all his life been very thirsty and perspired profusely. He passes about ten pints of urine in the twenty-four hours, and it contains 14·135 ounces of sugar. He was prescribed two-grain doses of codeia and Dr. Pavy's dietary. By the use of these means the diabetic tendency has been checked, and he is gaining flesh.

Case 4.—Mr. —, æt. 38, wishing to have his life insured, consulted me, and stated that he had been rejected five years previously by an office, as the medical referee had certified him to be suffering from diabetes insipidus. He is one of a large family, is well developed, and appears to ail nothing. His father died many years ago from pleurisy, and his mother enjoys excellent health at the age of seventy-eight. He presents no symptom of diabetes mellitus, but the sp. gr. of his urine is 1027, and it contains sugar, five grains to the ounce. He can "walk down most men," and feels in excellent health. Four days later the urine showed a sp. gr. of 1025, but no sugar. It contained a great excess of phosphates. On further examination in a week, without using any treatment, the amount of urine passed daily varied from four to two and a quarter pints; it contained an excess of phosphates, urea, and uric acid, had a sp. gr. of 1023, but showed no trace of sugar. In the following week there was a trace of sugar detectible by Trommer's test, and the sp. gr. was 1029. Six weeks later it is reported that the sp. gr. of the urine was 1024; and it contained sugar in distinct amount, requiring an equal amount of Pavy's solution to be affected, and with Moore's test forming a light golden colour, and causing a pale yellow deposit, probably due to phosphates. On this account Pavy's dietary was prescribed. Following this regime, in a month the sp. gr. of the urine fell to 1021, but sugar was distinctly perceptible on testing. He was allowed to resume his ordinary diet, and in a month later the sp. gr. of his urine was 1010, and no sugar could be found. Thus the case was watched month by month, and it became evident that the various increases in sp. gr. and in the amount of sugar coincided with increased brain-work. The urine passed after a long and hard day's work in town, especially if anxiety was superadded, was of higher specific gravity, and contained sugar, whereas rest and physical exercise reduced these conditions. The plan pursued, therefore, was to regulate the diet, and especially to reduce the strain on the nervous system. By these means he improved much, and some months later was received by a first-class insurance company at their ordinary rates. Now, for more than a year he has not been under my care, and I know him to be enjoying excellent health, and to be taking a full amount of open-air physical exercise.

Remarks.—Since the publication of Dr. Pavy's excellent and exemplary monograph on diabetes, the most important additions to the English literature of this subject have been furnished by Dr. W. Howship Dickinson and by Dr. T. Lauder Brunton.* To these it is well now to refer, and to compare some of the latest views regarding diabetes with the clinical observations above narrated. Till Dr. Dickinson drew attention to the constant presence of a peculiar cribriform appearance of the brain in diabetes, and to certain other collateral phenomena ('Brit. Med. Jour.,' 1870, i, p. 219), the post-mortem traces of diabetes were believed to be nil; or, at least, not uniform or pathognomonic. Dr. Johnson had observed, in death from this disease, that the renal epithelium was opaque, and sometimes exhibited an unusual amount of granular and fatty matter. Luys found gelatinous softening and discoloration of the medulla near the spot which experimental inquiry indicated as the glycosurial track. Dr. B. W. Richardson ('Med. Times and Gaz.,' May 10, 1862) records a case in which after death a calcareous growth was found pressing on the pons, and an abscess in the posterior cerebral lobes. Others, as Martineau and Tardieu, discovered softening, discoloration, or other lesions of the fourth ventricle. So also intracranial morbid growths have been considered by some observers to be the inducing causes of diabetes. In one instance, published by Nyman, a calcareous tumour, of the size of a hazel-nut, pressing on the right pneumogastric nerve immediately behind the tracheal bifurcation, is stated to have caused diabetes; while others, as Duncan (Edin.), could after death discover no pathological lesion except hypertrophy of the sympathetic.

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* Dr. W. Howship Dickinson, 'Diseases of the Kidney,' part 1, 1875. Dr. T. Lauder Brunton, "The Pathology and Treatment of Diabetes Mellitus." Three lectures in 'Brit. Med. Jour.,' 1878.

If, then, Dr. Dickinson's observations are confirmed by other workers at this subject a most important step in advance has been reached. Dr. Dickinson believes that diabetes "is produced by substantial and constant changes in the nervous centres, more or less significant because, as with many other diseases of these structures, they are such as ordinarily to elude the naked eye; but they are such as to give to diabetes a definite place among diseases of the nervous system." In the brain of diabetics, he says, "a practised and careful eye will often detect a fine porosity or cribriform appearance in limited patches of the white matter as if closely beset with pin-holes, each puncture containing a vessel much smaller than itself. More rarely considerable cavities, such as might hold peas, are seen, especially in the pons, in connection with one of the processes of the pia mater." He has also observed (as was the case in No. 1 of this series) frequently an increase of serum in the cranial cavity, so that the brain is what is termed "wet." In the spinal cord after death from diabetes Dr. Dickinson remarks that "the central canal is sometimes dilated or the commissure broken."

Describing these lesions more in detail Dr. Dickinson says, concerning the minute excavations or pores in the brain substance, that "they are caused by a destruction and absorption of the nervous matter along the course of arteries, and are, at least in some instances, caused by an escape of the contents of the vessel into the surrounding tissues, with consequent degeneration, softening, and removal of the nervous matter which has been permeated by the intrusion."

"The corpora striata, optic thalami, pons, medulla, and cerebellum are the chosen seats for the largest and most striking holes. In these situations the cavities are determined by the course of considerable arteries, or by penetrating folds of pia mater (p. 36). The products of nervous degeneration are first removed, then for a while the cavity contains only dilated or shrunken and obsolete arteries, with areolar tissue derived apparently from the perivascular sheath, and crystals of hæmatine. Lastly, these disappear also and a mere vacuity is left" (p. 38). In the more rapidly fatal cases Dr. Dickinson has observed these excavations to be larger, while in chronic cases they are generally empty. "The most striking change in the cord," he remarks, "is dilatation of the central canal, which in the dorsal and lumbar region is sometimes expanded to many times its normal diameter, and forms a conspicuous object immediately the cord is divided" (p. 41).

In tracing the relation of these pathological appearances to the diseased state termed diabetes, Dr. Dickinson considers the alterations in the capillary circulation of the brain to precede and induce the glycosuria. He says, "Localised loss of arterial tension, repletion of the affected trunks, consequent serous leakage, or corpuscular migration, and finally disintegration and removal of the permeated tissues, appear to constitute the alterations of diabetes as of other diseases of the nervous centres" (p. 45).

Now, clinical observation tends to add weight to this supposed series of pathological changes. In Cases 2 and 3 of those afore narrated the patients were past the meridian of life. They had entered, and indeed were well advanced in, the downward course which the human and animal machinery, like that of inert matter, pursues as the result of tear and wear. Every-day experience teaches that after about the age of forty the circulatory system at one or more points begins to give way, and of the coarser changes belonging to this class fatty heart and atheromatous blood-vessels are those most commonly recognised. Hence, also, increased physical exercise to stimulate the circulatory flow and the use of opium to allay nervous waste may be readily understood to benefit diabetics. In the treatment of diabetes, as in that of all diseased states, it is of primary importance for the practitioner to endeavour to sift out the cause of the pathological alterations. He should strive not merely to reduce the amount of urine passed, but should attempt to check the cause of the glycosuria by acting on the vascular system, by correcting the digestive machinery, or by aiding the chylopœtic viscera in performing their functions. Therapeutics is daily becoming more and more the science of arresting and correcting altered functions and processes; it is no longer the *art* of treating symptoms. It is important, therefore, for the general practitioner to adhere closely to the rule laid down by Dr. F. T. Roberts in his 'Handbook of Medicine,' viz. "to examine the urine for sugar in all cases of obstinate ill-health."

With this additional light thrown by Dr. Dickinson's observations we do well next to consider the diagnosis of diabetes in relation to its probable cause and in reference to the treatment most suitable for each form of the disease. The liver performs the double function (as regards the excretion of sugar in the physiological economy) of taking up sugar from the intestines and converting it into glycogen and of forming sugar from this glycogen, while the muscles probably act in the threefold manner of extracting sugar from the blood and converting it into glycogen, of forming sugar from this glycogen, and of changing "both the sugar they form and the greatest part of that which they receive from the blood into lactic acid and glycerine, which undergo combustion." Hence, diabetes may arise from increased formation of sugar or from lessened combustion. As is well shown by Dr. Brunton, many of the symptoms characterising the various forms of diabetes can, on reflection, be traced plainly to the probable ultimate origin of the disease. To show this at a glance let us compare side by side in tabular form the probable sources of glycosuria and the various symptoms characterising diabetes as stated by Dr. Brunton.

Diabetes may arise—	*Diagnosis—*
from increased formation of sugar, due to—	Patients ruddy and plump; temperature normal.

1. "Excessively rapid digestion of starch or sugar;	Sugar found after meals in urine, and arrested by abstinence from starch and sugar.
2. "To failure or imperfection in the glycogenetic function of the liver, and possibly, to some extent, also of the muscles;	
3. "To increased transformation of glycogen into sugar, due to accelerated circulation through the liver, or a larger proportion of ferment in the organ or the blood."	Goes on, though an exclusively flesh-diet be used. Accelerated circulation and increased-blood pressure indicated by the sphygmograph and stethoscope. "If there be no rise in the general blood-pressure we may suspect dilatation of the hepatic vessels; but it will be difficult to discover the cause of it."
From lessened combustion, due to— 1. "Insufficiency of the ferment, which should convert the sugar into lactic acid and glycerine; 2. "To an altered quality of the sugar, which enables it to resist the action of the ferment; 3. "To diminished circulation through the muscles, preventing the sugar from coming sufficiently into contact with the ferment."	Patients weak and emaciated; temperature below the normal.

As regards treatment, the history of the cases narrated at the commencement of this paper indicates plainly that of medicines opium and its alkaloid codeia are the drugs on which most reliance should be placed, while in my experience the lactate of iron and quinine has proved the most useful, probably because most easily digested, form of tonic. The importance of diet has been excellently urged by Dr. Pavy, and is now generally adopted in treating diabetics, but attention should also be given to the use of physical exercise, rest of the nervous system, and shampooing or hot baths to encourage cutaneous excretion.

Lastly, a word as regards prognosis. The dismal tale of the incurability of diabetes generally taught by teachers of medicine induces young practitioners to shake their heads ominously when first called on to tell the relations of a diabetic his prospects. Hence a reason for my narrating Cases 2, 3, and

4. If diabetes occurs after the meridian of life it may be regarded as probably an indication of one mode of breaking up of the system, and if the constitution of the diabetic be otherwise sound (if, for example, he be not intemperate nor affected with lung disease) our prognosis need not be unfavorable, there is a considerable likelihood of recovery. If, moreover, the glycosurial condition be due to excessive brain-work or other waste of nervous tissue, rest and freedom from anxiety may be expected to procure a favorable issue. So also in the case of children, the glycosuria may most frequently be traced to imperfect digestion or altered hepatic function, and hence it is of especial importance in treating diabetics to detect the cause and not merely treat symptoms. Diabetes is most fatal between the ages of fifteen and thirty-five.

Narrow escape from death under chloroform.

Mr. —, æt. 56, desired to have a small cystic tumour removed. Accordingly it was arranged with my friend Mr. Bell, of New Brighton, to administer chloroform while I operated. For two days and nights previously the patient had been brooding over the operation, and felt sure he could not take chloroform with safety. Both Mr. Bell and I examined him carefully, and found lungs and heart perfectly healthy, but the patient was of an extremely nervous temperament. Mr. Bell proceeded to administer chloroform very cautiously, while he and I alternately kept our fingers on the pulse. During the first few minutes of inhalation the patient took the chloroform quietly, but the pulse was inclined to be intermittent. Thereafter it became regular and strong, and the administration was proceeded with somewhat more rapidly. Just as Mr. — became anæsthetised he took an epileptiform fit, when respiration and pulse suddenly ceased completely. Mr. Bell and I used artificial respiration by Sylvester's method, but to no purpose, and a second slighter fit occurred. We sent for assistance, and meantime continued the artificial respiration. Now the countenance had assumed a cadaveric expression, and no sign of life could be elicited. On receiving assistance we tried inversion, as recommended by Nélaton, raising the feet high into the air. On laying him down again Mr. Bell and I renewed artificial respiration, but there was still no sign of life. Inversion was again used, and the face was seen to be congested. He was again placed recumbent, artificial respiration renewed, and now the pulse began to return and respiration was gradually resumed. By degrees he recovered, and is now in his usual health. Fortunately the operation had not been commenced, and other means have had to be used for getting rid of the tumour, as the patient would not again hear of excision.

Much writing and many words have been expended in insisting on the great risks attaching to the administration of chloroform. Like most surgeons who have used chloroform for many years I have seen a few narrow escapes from death under its administration, but having never met with a mortal case I believe death can be always prevented if the respiration and pulse be carefully watched during the exhibition of chloroform. Many hypotheses have been evolved to explain why chloroform should be fatal, and various precautions have been suggested, but as far as I have read a most important point has been overlooked. In order to produce anæsthesia it is necessary to alter the intracranial circulation, and in effecting this the whole circulatory apparatus is, so to speak, thrown out of gear. Now, this alteration appears to me to be plainly indicated by the patient, and occurs some time before anæsthesia. If carefully observed all patients, old and young, will be seen to gasp after having taken a few inhalations of chloroform. They endeavour also to push the handkerchief or inhaler from them, indicating thus that the chloroform is irritating the respiratory apparatus. Allow them to inspire pure air two or three times and they then will inhale the chloroform kindly. But now comes the critical stage, when such an amount of chloroform has entered the system that not merely is the peripheral circulation (for example, in the lungs) altered, but the heart is apt to be paralysed and become intermittent. This stage, I think, is always indicated by a holding-in of the breath or by very slight efforts at respiration. Remove the chloroform and allow pure air to be respired, then the heart reacts to a natural healthy stimulus, and the circulation is not thrown out of gear.

Tabulated Cases of Death from Chloroform.

No.	Sex and Age	Nature of case.	Where chloroformed.	Reference.	Remarks.	Post-mortem discoveries.
1	M. 26	Iridectomy	Birmingham Eye Hospital	B. M. Jour., April 6th, 1872, p. 368	Of intemperate habits. Struggled much. An inhaler was used. Operation had not been commenced.	Heart fatty.
2	F. 46	Ovariotomy	Private patient	B. M. Jour., April 20th, 1872, p. 419	Suffocated first by impaction in the glottis of a plate containing false teeth. Operation was not begun.	Heart flabby, and valves somewhat diseased.
3	M. 48	Cataract removal	Manchester Eye Hospital	B. M. Jour., May 4th, 1872, p. 472	Received it in the sitting posture. Had had chloroform repeatedly before. Operation had not commenced. Galvanism used as well as other means.	Heart fatty.
4	Young man	Phagedænic sore	St. Bartholomew's Hospital	B. M. Jour., May 4th, 1872, p. 483	No operation performed	No autopsy reported.
5	M. 36	Affection of jaw	King's College Hospital	B. M. Jour., June 15th, 1872, p. 646	No operation performed	No autopsy reported.
6	...	Excision of hip	Vienna	B. M. Jour., June 15th, 1872, p. 648	Disarticulation at the hip-joint was half completed	No autopsy reported.
7	M., æt. 42	Reduction of dislocated shoulder	Edinburgh Roy. Infirmary	Edin. Med. Jour., May, 1871, p. 961	Operation not completed. Galvanism used as well as other means	Had taken chloroform repeatedly before.
8	Elderly woman	...	Bristol Royal Infirmary	B. M. Jour., May 25th, 1872, p. 551	No details given. Operation had not been commenced	No autopsy reported.
9	Elderly man	...	Ditto	Ditto	No details given. Operation had not been commenced. Galvanism used as well as other means of resuscitation	Heart fatty.
10	M. 53	Lithotomy	Great Northern Hospital	B. M. Jour., April 24th, 1872, p. 225	Operation had not been commenced	No autopsy held.
11	F. 16	...	South London Ophthalmic Hospital	B. M. Jour., Sep. 18th, 1872, p. 357	Had had chloroform repeatedly before. An inhaler was used	No autopsy reported.

Tabulated Cases of Death from Chloroform—continued.

No.	Sex and Age.	Nature of case.	Where chloroformed.	Reference.	Remarks.	Post-mortem discoveries.
12	F. 70	...	Private patient	B. M. Jour., Oct. 5th, 1872, p. 388	No operation performed	No autopsy held.
13	M. 38	...	London Hospital	Ditto	Of intemperate habits. Operation half completed. Galvanism used	Heart slightly fatty and its muscle feeble.
14	Stout man	Amputation	Nottingham General Hospital	B. M. Jour., Oct. 12th, 1872, p. 418	Amputation completed when he was found dead. Had lived freely. Galvanism used	Had aortic disease.
15	F. 57	...	Private patient in York	Ditto	Struggled much. A sponge used for inhalation	No autopsy reported.
16	F.	Extractio dentis	Private patient	Boston: American B. M. Jour., Oct. 26th, 1872, p. 472	......	...
17	M. 49	Reduction of an old dislocation	Bristol Infirmary	B. M. Jour., Nov. 30th, 1872, p. 611	Of intemperate habits. Operation not commenced	Heart and lungs diseased.
18	M. 28	...	Private patient	B. M. Jour., Dec. 14th, 1872, p. 656	Operation not commenced	No autopsy reported.
19	M. 35	...	King's College Hospital	B. M. Jour., Dec. 28th, 1872, p. 717	He struggled hard, and this was followed by cessation of the heart's action. Galvanism was used	No autopsy reported.
20	F. 45	...	West London Hospital	B. M. Jour., Feb. 22nd, 1873, p. 205	Had been five hours without food. Chloroform administered, but as the pulse was irregular ether was substituted. Galvanism was used as well as other means. Operation not commenced	Heart fatty and valves atheromatous.
21	M. 15	Removal of necrosed bone	St. Thomas' Hospital	B. M. Jour., Mar. 22nd 1873, p. 321	Operation was not completed. Galvanism was used	Viscera apparently healthy.
22	M. 30	Operation for anal fistula	France	B. M. Jour., May 17th, 1873, p. 567	Operation completed. Galvanism used	Autopsy revealed nothing.
23	M. 60	Catheterism for perineal rupture	Yorkshire Asylum	B. M. Jour., May 24th, 1873	Clover's bag used for inhalation. Galvanism as well as other means of resuscitation used	Viscera seemingly healthy when examined.

24	M. 12	Extractio dentis	America	B. M. Jour., June 28th, 1873, p. 739	Inversion used as well as other means of resuscitation	No post-mortem held.
25	M.	Operation for necrosis	Army Blue-book	B. M. Jour., Aug. 23rd, 1873, p. 230	......	Hypertrophied heart with flabby valves.
26	M. 37	Tapping liver	Guy's Hospital	B. M. Jour., Sep. 13th, 1873, p. 334	Operation was not commenced	Heart healthy. Liver much diseased.
27	M. 48	Reduction of a dislocated shoulder	America	B. M. Jour., Nov. 8th, 1873, p. 546	Operation completed	No autopsy recorded.
28	M. 56	Excision of tongue	Sheffield Hospital	B. M. Jour., Feb. 27th, 1875, p. 277	Pulse intermitted during the administration, and the patient struggled much. Operation only commenced. Artificial respiration used before respiration and pulse ceased	Both pleuræ adherent, but viscera healthy.
29	M.	Removal of necrosed bone	Adelaide Hospital	B. M. Jour., July 17th, 1875, p. 75	Showed great muscular excitement. Galvanism and inversion used	Viscera healthy except the liver, which was somewhat enlarged.
30	F. 45	Removal of eyeball	Addenbrooke's Hospital	B. M. Jour., July 31st, 1875, p. 143	Threatened with delirium tremens on the preceding night. Artificial respiration used before breathing and pulse ceased. Galvanism and Nélaton's method used	Tumour found in the right ventricular wall.

From merely glancing at these thirty cases, I have extracted and tabulated, several instructive lessons may be learned. In the majority of instances (thirteen out of twenty where this point is specified) the operation, to aid which chloroform was administered, had not been commenced when the fatal symptoms were observed. This seems to me to confirm the remark before made, that the critical stage in the production of anæsthesia by chloroform is that point, just before complete anæsthesia is reached, where the circulatory machinery is apt to become displaced. In three of the above instances is the patient stated to have been of intemperate habits, and in an equal number of cases is some form or other of inhaler said to have been employed. Moreover, in the majority of the cases tabulated (in sixteen of them) we learn the post-mortem appearances observed, and it is important to notice that in some instances no pathological condition was detectible, while most of them showed only a fatty condition of the heart or a flabby state of the cardiac walls. In eleven instances galvanism was used as well as other modes of resuscitation, but in three only does Nélaton's method of inversion appear to have been tried. With regard to the means of recovery to be employed in cases of impending death from chloroform it is *most* important, I think, to bear in mind the physiology of the process. Prof. Erichsen (in 'Brit. Med. Journ.,' June 8th, 1872, p. 603) divides deaths from chloroform into three groups, inasmuch as they may be regarded as due to asphyxia, to coma, or to syncope; that is, as the organs more immediately affected may be regarded to be the lungs, the brain, or the heart. But, as Prof. Lister wisely remarks, the surgeon who meets with a case of death from chloroform is apt to show a "strong tendency to twist the evidence unconsciously to himself in favour of inevitable syncope rather than preventible asphyxia." Now, as has been already remarked, the danger lies in the revolution against the circulatory government induced by chloroform. The pulmonary circulation is first affected by the foreign irritant, by its diminishing the muscular efforts at respiration, and by its chemically altering the blood. Then, secondarily, is the heart acted on by the increased strain thrown on it through the sudden changes in the pulmonary circulation, while its own blood-supply and its contents are both chemically affected by the anæsthetic. Hence we find that shortly before complete anæsthesia is reached the right chambers of the heart become over-distended; if they contract all goes well, but if a contraction is missed the heart has extreme difficulty in readjusting itself and in overcoming the effects of even this momentary inertia. Now, it is curious to remark that in six of the cases tabulated, in which it is reported that galvanism was superadded to the other means of resuscitation, it is also stated that in them after death was found disease of the heart or aorta. This it is important to bear in mind when using electricity to restore life, for by so doing we may be employing the very means which is most detrimental to our purpose; while galvanising a fatty or weak heart cannot possibly irritate it into action; it will probably overstimulate it into inertia. It is also well to remember that an electric shock passed through the par vagum will paralyse the heart. Electricity should be *the last means* of resuscitation to be employed in cases of suspended animation induced by chloroform, and in using it the best method I have found to be to place one pole over the epigastrium and the other at the nape of the neck. Moreover, a continuous current should alone be used. Almost no occasion tries a surgeon's self-possession so much as to be about to operate on a patient who dies from chloroform. Hence, instead of following a distinct mode of treatment and continuing in it for some time the surgeon is most apt to follow each suggestion of his bystanders till, by so doing, he produces probably just the reverse effect from what he intended. *Nimia diligentia* is most carefully to be avoided in this as in other matters.

What, then, may be regarded as the best *modus operandi* in cases of death from chloroform? Case 28 in the preceding table leads me to remark, by the way, that it is unwise—probably dangerous—to commence using artificial respiration or other means of resuscitation before respiration and pulse have actually ceased. The natural stimulus of fresh pure air, though apparently slight and acting slowly, will probably be much more sure to restore animation than the employment of active stimulation of the respiratory or circulatory viscera. When life has apparently ceased the first means to be used consist in pulling the tongue well forward, striking with the fist firmly on the epigastrium, so as to push up the diaphragm, and in blowing lustily into the patient's mouth. This last procedure is reported to have been very successful in Sir William Ferguson's practice. Thereafter artificial respiration and the inversion process should be used *together*. Mr. S. M. Bradley, in 'Brit. Med. Journ.,' June 12th, 1875, gives a very good example of the success of this double procedure. It may be here remarked, by the way, that, though the inversion method is ordinarily termed Nélaton's method, Mr. Brown, of Haverfordwest, is probably the first to have used this plan, and to have suggested it in the 'Brit. Med. Jour.,' 1871, vol. ii, p. 13. This method of inversion of the body I saw tried first in Edinburgh, where I suggested its employment in an instance of chloroform-poisoning, which was afterwards published in the 'Edin. Med. Jour.,' June, 1875. In this instance I saw the patient many hours after he had swallowed chloroform, during which time artificial respiration and galvanism had been employed perseveringly. Accordingly inversion of the body by raising the feet high in the air had no effect, whereas, in the case of Mr. —— above narrated, inversion caused the blood to rush into the face, probably also into the cranium, and with artificial respiration it proved the means of his ultimate recovery. Should these means not suffice a stimulant enema should be given, and be followed by the application of a continuous electric current.

It is curious to note, lastly, how few examples of recovery from apparent death from chloroform are to be found recorded in medical journals. I have been able hurriedly to collect a record of only five such in the 'Brit. Med. Jour.,' May 25th, 1872, p. 551; and in these instances restoration to life is ascribed to the employment of galvanism. The three other such cases I have met with in my practice were these. A young man whose hæmorrhoids I ligatured was observed at the completion of the operation to have ceased breathing and his pulse stopped. A short use of artificial respiration with traction forward of the tongue brought him round. In another instance I had removed necrosed bone from the tibia of a girl aged fifteen. For several days prior to the operation I required to give her chloroform before each dressing, as the pain was extreme. After the operation she was observed to be pallid and not to breathe. A smart blow in the epigastrium in her case was sufficient to re-excite respiration. In the third instance a child about six years old required to have a tooth removed, as it was overcrowding the neighbouring ones. I made several attempts to remove the offender, but it was too firmly fixed. Having administered chloroform I readily extracted the tooth, but immediately thereafter respiration and pulse ceased. The employment of stimulants (as sal volatile, applied to the nostrils and given internally with brandy), along with artificial respiration, soon brought her round; but she required to be watched carefully, as she fainted repeatedly during the following two hours.

Before closing these remarks I would draw the attention of surgeons who recommend the substitution of ether for chloroform to an observation made by Mr. F. Jordan, of Birmingham, and published in the 'Brit. Med. Jour.,' Jan. 30th, 1875, viz. that ether does not produce complete anæsthesia, as shown by reflex muscular tremor, and therefore it is safer for most surgical operations, though unsuitable in cases of the ligature of arteries (one of which was Mr. Jordan's case), where *absolute* stillness is necessary.

Case of serious injury to the cerebro-spinal system induced by a fall at football.

A young gentleman, æt. 20, in height six feet two inches, with a strongly-built frame, was playing at football on November 15th, 1873, when, missing a "drop-kick," he fell heavily on his back, especially on the back of his head and neck. He got up unaided and attempted to walk, but in a few minutes he felt compelled to lie down on the grass (which was very damp). Some minutes later he was observed to be convulsed, and was removed in an unconscious state to a neighbouring house whither I was summoned, and saw him in about half an hour after his fall from the missed kick. I found him in a state of opisthotonos, with arms stretched straight out, teeth firmly clenched, and not respiring. The convulsive state lasted a minute, and the interval was two minutes in duration. He said in a whisper that his "back was broken." Swallowing or the slightest voluntary effort caused an acceleration of the convulsions. The only means procurable were hot water and mustard, which, combined with brisk friction, were applied along the spine; and by these means the intervals between the convulsive attacks were prolonged.

Having got him removed to his lodgings, ice was applied along the entire length of the spine in one spot after another (the ice being placed on the skin), and I administered chloral hydrate, 30 grs. in syrup. In fifteen minutes later, having had another convulsion, I gave him 20 grs. more of chloral hydrate. During the subsequent half-hour, having had two more convulsions, though of not such severity as the preceding, he got 20 grs. more of chloral; in all he had received 85 grs. of chloral within three hours after his accident, and there was no return of the convulsive condition. At this time his pulse was 60; he was semi-conscious and inclined to dose; he complained of pain in the head; had a flushed face, and was squinting. The ice was removed from the spine and applied to the head.

Next day he was very drowsy, but answered questions correctly, and still complained of pain in the head. In eleven hours later he became sensible and said he was "sore all over." He knew nothing of the accident, nor of what had happened since. On cross-examination he recognises a feeling of constriction round the waist, and has pain along the right sciatic and down the leg, which he flexes with difficulty. On bending the body forwards he describes a pain shooting up the spine to the head. Pulse normal and bowels acted on.

On the second day after the accident his pulse was 48—50. He said he felt dizzy, had pain in the head when he moved, talked, or listened much. In getting him out of bed I observed that he pushed his right leg straight out, and kept the left leg flexed to use it as a paddle. On attempting to walk he dragged his right lower limb and on moving felt severe pain shooting up his back. Over the lower dorsal and upper lumbar spinous processes he felt much pain on pressure with the finger; accordingly mustard plasters were ordered to be applied over this part.

Next day his pulse was 54 and irregular, and he felt rather better.

On the following day (fifth after the accident) he felt much better. Pulse 54 to 56, irregular. On auscultation both cardiac sounds were observed to be reduplicated at the base and apex, and this condition was traceable along the aorta and below both clavicles.

Two days later there was detectible with the stethoscope reduplication of the second cardiac sound only, and chiefly at the apex. Pulse 56 to 58, almost regular. He is able to recline on the sofa during most of the day without inconvenience, but cannot sit up. Placing his right foot on the ground causes much pain in the back and along the corresponding sciatic nerve, while on bending his body forward he still feels the pain shooting up his spine. Headache nearly gone.

In three days more he could bear the weight of his body on his right lower limb, but he walks with difficulty with the aid of chairs. He used to be troubled with formication in the right lower limb in certain positions, but this now is nearly gone.

A fortnight after the accident it is reported that he feels no pain in the head, but becomes dizzy if he stands long. On making him flex his right thigh on his body while lying on his back, he felt very great pain passing from the hip to the back. In straightening himself he requires to do so very cautiously, because of lumbar pain and an occasional twinge passing up the spine. Sometimes he still feels his old pain along the right sciatic nerve, but it descends only as far as the knee. He cannot yet bear the entire weight of his body on his right lower limb, and so he goes about on crutches. There is still some pain on pressure over the lumbar spinous processes and over the right sciatic nerve. Counter-irritation with mustard is at intervals applied over those parts.

Two days later, after exerting himself more than usual in walking on crutches, he was taken to bed complaining of headache and dizziness. His bowels were also costive. Pulse 54; ordered croton oil gtt. ss and chloral gr. x.

Next day his pulse was 60, and he appeared drowsy and breathed hurriedly when asleep. Complained of frontal headache and great tenderness over the lower dorsal and upper lumbar vertebral spines. Pupils dilated. In the afternoon his pulse was 54, and he trembled much when getting out of bed. On moving he becomes very giddy and the muscles of the back and lower limbs are very rigid. During this illness he has twice felt cramps in the right leg. Ordered Emplast. Lyttæ over the painful part of the spine and Extr. Belladon. gr. ss. *ter in die* in pill. About midnight his pulse was 48 to 50 and very weak. Pupils fully dilated, and he squints occasionally; he feels sick. At a consultation held this afternoon an unfavorable prognosis was given by the consultant.

On December 4th, following day (nineteenth after the accident), he was decidedly better, but his pulse was 48 and weak. He complained of considerable abdominal pain, especially on the right side, which was increased on pressure. The recti abdominis were rigid; pupils dilated; he yawned much and felt dizzy on moving in bed. In the evening he appeared much better, and his pulse was 58. The muscles contract, and pain is evinced when a brush is drawn gently over the lumbar spinous processes. Pupils less dilated, but his eyeballs feel sore when moved.

Next day his pulse was 66 and stronger. Had slight headache, but his muscles were not so rigid.

Two days later (December 7th), when another consultation was held, it was found that he could move his right lower limb without much pain; he had no cramps, and his pupils were normal.

From this date onwards convalescence was uninterrupted. On December 13th it is noted that he felt slight pain on pressure firmly with the finger over the spines of the four lower dorsal and the three upper lumbar vertebræ, and along the track of the right sciatic nerve.

In two months after the reception of the accident this patient was able to walk about without discomfort and unaided. A month later he was shooting over the Scotch moors.

Remarks.—This case is a typical example of a form of injury, and it presented a series of symptoms which so commonly follow a railway collision and no other accident, that to this class of injuries is ordinarily applied the term "railway spine." Yet in neither Professor Erichsen's admirable monograph* nor in any of the many medical journals I have consulted could I find an instance of equally severe symptoms induced by any other cause than a railway collision. On this account this case has appeared to me to be worthy of record; but it has been also very instructive in the fulfilment of the prognosis given a few hours after the reception of the injury. Bearing the *cause* of the accident and the manner of its reception in mind, as also the youth and physical contour of the patient, a favorable prognosis was given at first, and firmly adhered to in spite of the relapse which occurred on the nineteenth day after the accident. As regards treatment this case shows the importance of *at once* using means indicated by physiology guided by correct pathology. In such instances delay means failure, and the first few hours after the reception of the accident are the most precious in relation to the probability of a successful issue. The origin of the irregular cardiac action was probably the injury of the nervous centres, and it would be well that this were borne in mind when a like altered circulation is met with after a railway accident.

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* 'On Railway and other Injuries of the Nervous System.'

MORPHO-PHYSIOLOGY AND GENERAL PHARMACOLOGY.

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THE science of life is generally studied under two leading aspects. In the branch of biology which constitutes anatomy or morphology, cognisance is taken chiefly of the *form* of organisms and only incidentally of their *acts*; while in physiology the study of *acts* becomes paramount, and of *form* secondary. It is true that morphology cannot be prosecuted to the entire exclusion of a consideration of *function*, nor physiology to the exclusion of *form*; yet in neither the one nor the other are the actions and reactions of form and function systematically examined. "If the idea of life," says M. Comte, "is really inseparable from that of organisation, neither can be severed, as we have seen, from that of medium or environment, in a determinate relation with them. Hence arises a third elementary aspect; viz. the general theory of organic media, and of their action upon the organism, abstractedly regarded;" and he adds, "unhappily this portion which, after anatomy proper, is the most indispensable preliminary of biology, is still so obscure and imperfect that few physiologists even suspect its existence." *

Since the days of Comte this branch of biology, which for lack of a better name I will take leave to call morpho-physiology, has been successfully prosecuted in various departments. The actions and reactions of structure and of function as displayed in successions of organisms has been placed upon a truly scientific basis by the labours of Darwin, and much is being done in various directions by the workers of the present day to fill up the gap noticed by the distinguished French philosopher. Much, however, remains to be done before morpho-physiology will be in as developed a condition as its twin sisters, morphology and physiology, and yet a knowledge of the former is as indispensable to all practitioners who endeavour to modify organisms as of either of the latter. It was a close observation of the modifications of organisms produced by breeders of domesticated plants and animals that suggested to Mr. Darwin's mind his theory of the origin of species; and now the instructed breeder finds the main basis of the practice of his art in the science constituted by Mr. Darwin; and if the medical man would aim at improving the health of families and races of his fellow men he must also seek the roots of his practice in this branch of biology. Nor is the case different when he endeavours to treat diseased individuals. Does a surgeon wish to remove a diseased limb, his problem is to ascertain what effect will such an interference with the structure of the body have upon its functions; while the physician, on the other hand, wishes to know with what alterations of structure manifest aberrations of function are associated; and how to modify the former in order to restore the latter to normal action. For the attainment of such information it is necessary to possess a knowledge of the influence exerted upon organisms by what M. Blainville calls "exterior modifiers." A science must be constituted connecting determinate changes in the medium with definite changes of organisms under the correlative aspects of structure and function. The little knowledge we possess of the ætiology of disease when connected with the descriptions of pathological anatomy and the correlative descriptions of altered functions given in our records of diseased states is a very imperfect example of the nature of the facts which must go to constitute this branch of biology. But science takes no special cognisance of disease. The division of organisms into healthy and diseased belongs to the classification of art and not of science; therefore, this branch of biology must appropriate the facts which relate to the modification of organisms, when the change produced by altered conditions improves as well as deteriorates the normal health of the organisms.

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* 'The Positive Philosophy of Auguste Comte.' Translated by Harriet Martineau. Vol. i, p. 365.

How very limited and imperfect is our knowledge of the facts requisite for the formation of this branch of science is too obvious to require pointing out. The connection between definite changes in the medium and definite changes in the organism even in the case of men is only clearly made out in comparatively few cases; and our knowledge of the relationship between these changes in reference to domesticated plants and animals is still less; while with regard to organisms not subjected to the immediate control of man information is almost totally wanting. It is true that men of science are daily accumulating the requisite facts, more especially by what is called experimental pathology; but much remains to be done on every side before morpho-physiology, both as it relates to individuals and to successions of individuals, can be placed on a broad and comprehensive basis. Since our collection of facts is so scanty it would be quite futile to endeavour to co-ordinate and generalise the facts. With reference, however, to a limited portion of the field something may be done even at present in order to systematise the facts. There are certain agents which may perhaps be with more propriety called *interior* rather than *exterior* modifiers, inasmuch as they produce their influence after gaining entrance into the circulating fluids of organisms. These agents must be *heterogeneous* either in quantity or quality or in both respects to the normal constituents of the healthy organisms at the time, otherwise no modification of the healthy condition would be produced. Such agents are called drugs, and the science which treats of their effects upon organisms is pharmacology. This branch of the science of morpho-physiology is at present in too close alliance with the art of medicine. A certain drug is found useful or supposed to have been useful in the treatment of a particular disease, and forthwith one or more hypotheses are advanced in order to account for its curative action; and the hypothesis which is in most accord with the modes of thought of medical writers finds its way into our theory of therapeutics. Until recently the investigation of the action of drugs was undertaken almost solely by the practitioners of the art of medicine, and consequently it is not surprising though the science of pharmacology so far as it had any existence was largely influenced by the speculations of the practitioner. But the prospects for the progress of pharmacology as a science are becoming brighter. Such physiologists as Cl. Bernard, Hermann, Rutherford, and a host of others on the Continent and in this country are investigating the action of drugs, independently of any immediate application of the knowledge obtained; hence we may hope that pharmacology will become separated from the art of medicine, and that the practice of the latter will repose upon the theorems of the former.

Just as astronomy could not make much progress until it became separated from the art of navigation, as chemistry could not advance until it was rescued from the hands of agriculturalists and medical practitioners, and as geology did not assume the form of a true science until it was freed from the speculations of practical engineers and miners; so pharmacology cannot make any true progress until it is liberated from the hypotheses and assumptions of the practitioners of the art of medicine. Pharmacology, like most other sciences, must be *general* and *special.* The former will comprise formulæ which are true not of the action of drugs upon this or upon that organism, but of their action upon all organisms whatsoever; while the latter will deal with the action of drugs on particular species of organisms. General is frequently called comparative pharmacology because the comparative method of investigation is principally employed in founding the science; and since a similar designation is given to the corresponding department of anatomy, physiology, philology, and various other sciences, no special objections can be urged against it in this instance.

The fundamental law of general pharmacology was laid down in general terms by Comte. "Placed in a given system of enterior circumstance," he said, "a definite organism must always act in a necessarily determinate manner, and inversely the same action could not be precisely produced by really distinct organisms."* This statement simply amounts to a declaration in specific form that the law of universal causation is as applicable to this as to all other branches of human knowledge. This wide generalisation may, however, be split up into still more specific laws. The action produced upon organisms by changed circumstances, such as the introduction of a drug into the circulating fluids, admits of degrees of comparison. On comparing the action of drugs upon different organisms, the likenesses and unlikenesses of the effects produced may be formulated in the following manner: —other circumstances remaining the same the actions produced by the same drug upon two or more organisms are similar when the organisms are similar, less similar when the fundamental likenesses between the organisms are less, and only remotely similar when the likenesses between the organisms are small. From this law it follows that the generalisations which give the best expression to the varying degrees of likenesses and unlikenesses of organisms of all kinds can be adapted so as to give expression to the varying likenesses and unlikenesses between the actions produced by any particular drug upon organisms. The classification of organisms is merely a method of grouping the like and separating the unlike; consequently organisms which are grouped together because of close fundamental likenesses will react to the action of drugs more similarly than do organisms which are separated from each other owing to fundamental unlikenesses. And since the most trenchant division of organisms is that which separates them into vegetables and animals, or according to Hæckel to vegetables, animals, and protista; this will give the most trenchant division of the reaction of organisms to the action of drugs. The action of a drug on any one vegetable is more similar to its action on any other vegetable, and its action on any one animal to that on any other than its action on any vegetable is to that on any animal. It follows from this law that the actions of a drug are more similar on living beings of the same species than on those of different species. These laws are no doubt liable to numerous exceptions; similar structures are sometimes developed in organisms which are widely different in genetic affinities, and no doubt such organisms may manifest similarities in their reaction to drugs; but our knowledge of facts is so meagre that it is difficult to obtain a sufficient number to illustrate the truth of the law, not to mention facts illustrative of the exceptions.

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* 'The Positive Philosophy of Auguste Comte.' Translated by Harriet Martineau. Vol. i, p. 363.

Let us now compare, not adult, but developing organisms, and we shall find that the law which gives the most general expression to the varying degrees of likenesses and unlikenesses of developing organisms of all kinds will also give the most general expression to reactions of such organisms to the actions of drugs. Such a law is that formulated by Von Baer. This law, as quoted from Mr. Herbert Spencer's biology, may be modified in the following manner so as to adapt it to the action of drugs. The action of a drug on an organism in its earliest stage is similar to its action on all other organisms in their earliest stages; its action on the same organisms at a somewhat later stage of development is similar to that it produces at corresponding phases on a less extensive multitude of organisms; at each subsequent stage peculiarities of action become manifest, which successively distinguish that produced on the developing embryo from that produced on groups of embryos which it still resembles; and thus the action produced on the organisms displays peculiarities which narrows the similarity to that produced on the species of which it is a member. Our knowledge of facts illustrative of this law is also very meagre. Few, however, will be disposed to question that the action of any one drug, alcohol for instance, on the impregnated human ovum will be more similar to the action it produces on all other ova and on the protozoa than that produced on adult organisms. We also know that the effects of certain drugs on the lower animals and on children are more similar than those on the lower animals and adult man. Opium, for instance, frequently causes convulsions in some of the lower animals and in children, and very rarely in adult man; while, on the other hand, the lower animals and children exhibit much greater tolerance towards mercury, arsenic, and other drugs than do adult men.

Let us now experiment with one particular agent, and while varying the organisms acted on to the widest possible extent let us assume that other exterior circumstances are constant; we shall find that as we proceed from the lower to the higher organisms, or from the embryo to the adult condition, the effects become more varied and multiplied—in one word, more heterogeneous. Take for instance the action of ethyl alcohol on various organisms. It checks the movements of protozoa and kills them without producing any other symptom. Leaving out of account its action on vegetables, not because it is unimportant, but because so little is known respecting the action of drugs generally on these, let us administer it to an animal a little higher in the scale than the protozoa. When it is administered to one of the articulata there are no marked contrasts between its effects on various parts of the body. It kills by an almost simultaneous suspension of all the functions. When, however, it is administered to one of the vertebrata its effects, both simultaneous and successive, are varied and multiplied, and the multiplication and variety of effects reaches its height in man, where it causes moral and intellectual changes which have no counterpart in its effects on other animals.

But as we proceed from the lower to the higher organisms, not only do the effects become more heterogeneous, but they become more special. When alcohol is administered to the higher vertebrata, its action on the nervous system becomes so prominent as to mask that produced on other tissues. In order to account for this speciality of effect, it has been assumed that alcohol has a special affinity for nervous tissue, but there is no reason to make this assumption. Alcohol is a very indifferent substance, having chemical affinities of narrow range; and since it enters into no strong chemical unions without the body, there is no reason to believe that it will exhibit strong affinities within the body. And, moreover, it checks the amœboid movements of the white blood-corpuscles, and the movements of the cilia of the bronchial mucous membrane, showing that much of its action is independent of the nervous system. Various reasons might be given to explain why an agent which acts indifferently upon all tissues should yet produce a more special action on one part of the body than on another, but a few of these must suffice. It is probable that no agent can act until it come in contact with the protoplasm of the tissues; and in some tissues the intercellular substance is so dense, that even a diffusible agent like alcohol will take a comparatively long time in gaining access to the protoplasm, while it will gain ready access to the protoplasm of such a delicate structure as that of nervous tissue. And from the regulative nature of the actions of nervous tissue a very slight interference with its structure will produce a large and manifest effect upon the functions of the body; while a very considerable interference with the structure of passive tissues, like bone and tendon, and even most mucous membranes, will produce a very inappreciable effect. The more freely an organ is supplied with blood, the more freely will an indifferent substance like alcohol also be supplied to it; hence an organ performing a very active function will have more supplied to it than one performing a less active function, and consequently the agent will appear to have a special action on the tissues of the active organ. These considerations show that, as we proceed from the lower to the higher organisms, not only does the action of an agent become more heterogeneous, but also more special, even if the agent itself is an indifferent substance, acting in a similar manner on all living tissues whatsoever.

We have hitherto maintained exterior circumstances and the kind of drug constant, and varied the organisms acted upon; and now let us keep exterior circumstances and the organism to be acted upon as constant as possible, and vary to the utmost extent the nature of the drug. We shall now find that the actions produced on similar organisms by different drugs are similar when the drugs are similar in chemical and physical properties, and the likenesses between the actions produced become less and less as the drugs become removed from each other in their fundamental properties. This law has been enunciated in somewhat different terms, and from somewhat different standpoints, by Drs. Broadbent, Crum Brown, and Fraser, and it is needless, therefore, to discuss it further at present.

But when the organism acted upon is highly differentiated in structure and chemical composition, specialisations of chemical action will occur when heterogeneous agents are introduced into the circulation. Like will gather to like, and when an agent cannot meet with others exactly similar to itself, it will select that part of the body which is most similar to it. In this way each drug does not act alike over all parts of the body; but the compounds of the chemical agents, which have massive atoms, act principally upon the dense parts of the body; whilst those of the least massive atoms act upon those parts of the body which have a delicate structure, like muscle and brain, and on tissues which have no real structure like the blood.

The salts of iodine, mercury, silver, lead, and of the metals generally act upon the bones, tendons, and cellular tissue; those of potash and soda upon muscle; those of carbon and the gaseous elements, principally upon nervous tissue. This law also explains why the compound of the elements, having massive atoms, are eliminated by the bowels, those of the elements with atoms of medium mass by the kidneys, and volatile substance partly by the skin, but principally by the lungs.

It has already been noticed that before an agent can produce a drug action it must be heterogeneous to the organism, and it may now be added that, other things being equal, the more heterogeneous an agent is to an organism the greater will be its effect. That such a law should obtain is only what might be expected when we take into consideration the wonderful manner in which organisms of all kinds adapt themselves to their environment. This power of adaptation explains why organisms by frequent repetition tolerate agents such as arsenic which are generally extremely poisonous. After such an adaptation of an organism to a particular drug has taken place, the drug is less heterogeneous to the organism than it was prior to the adaptation. The law of heterogeneity may help to explain why an agent which is very poisonous to one organism is often little poisonous to another. Quinine is more poisonous than strychnine to the protozoa, and much less poisonous to the higher animals; and chemists have discovered alkaloids in the higher animals closely resembling quinine. On contrasting the actions of the various alcohols the non-atomic saturated alcohols are poisons, the diatomic alcohols or glycols are less poisonous, the triatomic alcohols or glycerines have still less effect; while the tetratomic, pentatomic, and hexatomic alcohols are either inert or are foods.

The hexatomic alcohols or glucosides are homogeneous with the body and consequently are foods; while the monatomic are both physically and chemically more heterogeneous to the body than any of the intermediate alcohols, and consequently produce a more deleterious effect. Another reason why the hexatomic alcohols act as foods, while the alcohols with saturated radicals act as poisons, is, that the former are less stable than the latter, and consequently undergo with readiness transformations within the body whereby force of some kind is evolved.

A more or less parallel fact may be noticed with regard to inorganic substances. Those inorganic agents, such as iron, phosphorus, and sulphur, which play an important part in the formation of structure are either trivalent or some higher degree of atomicity; and, as a rule, the agents which possess the higher degrees of atomicity, even when heterogeneous to the body, act as tonics, while those which are univalent or bivalent are irritants. This law has a sufficient number of exceptions to show that irritant or tonic qualities must depend upon other properties than the atomicity of the agents.

Another law is that, other things being equal, the greater the molecular mobility of an agent the sooner it gains entrance into the body through the absorbing surfaces, and the sooner it is eliminated.* This law explains why nitrous oxide gas acts more rapidly, but more evanescently than ether, and ether than chloroform, and chloroform than chloral. Closely relative to, though not identical with this law, is the one that the compounds of the elements with the massive atoms are relatively long in being absorbed, and are correspondingly long in being eliminated, and when the agents form like the metallic salts stable compounds with albumen, the length of time before they are eliminated is much increased.

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* The effect of that kind of molecular mobility which consists in being readily soluble in water or in the fluids of the body is well illustrated by the compounds of mercury. The more soluble compounds are readily absorbed, and hence produce a more powerful action. Hermann says—"Es scheint, dass die Löslichkeit die ätzende Wirksamkeitbedingt, dass also jedes überhaupt lösliche Quecksilberpräparat zu den 'fortiora' gehört. Besonders kommen in dieser Hinsicht in Betracht: das Chlorid ($HgCl_2$, Sublimat, bei 20° in 13, 5 Th. Wasser löslich), das Bromid ($HgBr_2$, etwas weniger löslich), das Jodid (HgJ_2, schwer löslich), das Oxyd- und Oxydulnitrat ($Hg_2N_2O_6$ und HgN_2O_6, beide löslich, mit viel Wasser Niederschläge von basischem Nitrat gebend), das Oxyd (HgO, wenig löslich), der weisse Präcipitat (Hydrargyrammoniumchlorid, $NHgH_2Cl$, ein in Säuren, also auch im Magensaft leicht löslicher Niederschlag).—Zu den wegen Unlöslichkeit nicht ätzenden (milden) Quecksilberverbindungen gehören das Chlorür (Hg_2Cl_2, Calomel), das Bromür und Jodür (Hg_2Br_2 und Hg_2J_2), das Oxydul (Hg_2O, mit Magensaft in Calomel übergehend), das Sulphür und Sulphid (Hg_2S, HgS), u. s. w. ('Lehrbuch der Experimentellen Toxicologie. Von Dr. L. Hermann. Ser. 213, 1874.)

Another law is, that in binary compounds both elements are represented in the effect, but the action of the heavier atomed element will predominate. Take, for instance, the chloride, bromide, and iodide of potassium. In the first the action of both elements is represented, but that of potassium predominates; in the second, the action of the bromine predominates; but when an animal is poisoned with bromide of potassium the action of a potash salt on the heart is apparent; while in the third the action of the iodine largely predominates. An agent, however, which produces a very energetic effect like hydrocyanic acid makes its influence predominate even in composition with the heavier atomed elements. At the same time cyanide of mercury acts much less energetically as a cyanide than does cyanide of potassium or of sodium. One reason of the less energetic action of the former than of the latter is, that, in equal weights, the cyanide of mercury contains much less hydrocyanic acid than does the cyanide of potassium or sodium, and the fact that binary compounds will contain a larger quantity of the heavier than of the lighter atomed element may help to explain to some extent the action of the law just enunciated. This law may be traced in the action of compounds of a higher degree of complexity than the binary.

We shall only mention two other laws of the action of drugs at present. The first is that, other things being equal, the more massive the molecule of the element, the more definite and local will be its action or that of its compounds; and the second, that, other things being equal, the greater molecular mobility of an agent, the more general and diffused will be its action, or that of its compounds. These laws frequently coincide, yet there is more than a verbal difference between them. Mercury, for instance, is an element with massive atoms, hence the action of its compounds should be local and specific; but it possesses great molecular mobility since it volatilises at ordinary temperatures; hence it should exercise a wide and diffused action upon organisms. Reference to observed facts shows that, although the action of mercurial compounds is specific, yet it is of wide extent. One of the most beautiful illustrations of the first of these laws is to be found in the experiments of Drs. Dewar and McKendrick on the action of the chinoline series. They found that chinoline (whose composition is C_9H_7N, and boiling-point 238°) has an action somewhat similar to that of chloral; and as they ascended in the series, the action on the sensory part of the encephalon became less marked, and that on the motor centres more manifest, until the highest member of the series ($C_{16}H_{21}N$, with boiling-point above 300°) produced death by convulsions and subsequent paralysis not unlike the action of strychnine. As the molecule of the agent became more massive, the action became more special and local; the higher part of the brain was unaffected at first, then the lower ganglia, until at last scarcely any part was affected except the cord.

Comparative experiments with other agents would no doubt exhibit a parallel speciality of effect according as the molecule of the agents increase in mass and complexity. This law can be traced amongst inorganic compounds. The actions of the salts of mercury, silver, and lead are much more definite than those of potash, soda, and magnesia. How much more definite is the wrist-drop, colic, and blue alveolar line of chronic lead poisoning than the multiplied and indefinite symptoms caused by chronic potash poisoning.

ON PERI-URETHRAL ABSCESS AND PERINEAL SECTION.

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THE following cases of peri-urethral abscess include four where perineal section was performed. Their details are interesting as illustrating certain points in the pathology of abscess occurring under circumstances which may be regarded as common to the whole series. I shall relate them in the order they came under my notice; the earlier cases being observed during my period of office as surgeon to the Northern Hospital in this town.

CASE 1.—*Traumatic stricture; abscess communicating with the urethra; extravasation of urine; incision; Holt's operation; recovery.*

J. C—, labourer, æt. 45, was admitted into the Northern Hospital under my care on March 20th, 1867. Five years ago he received an injury to the scrotum, and since has suffered from stricture. The difficulty in passing water had progressively increased. Twelve months previously he was in the hospital for extravasation of urine. He left before his treatment was considered sufficient.

Three weeks ago some hardness again appeared in front of the scrotum, and with this there was an increased difficulty in urinating. Two days before his present admission an abscess burst in front of the scrotum, externally, and this was followed by rapid swelling of the scrotum and adjacent parts.

On admission the scrotum was enormously swollen and tense. There was no fulness in the perinæum. On introducing a catheter a stricture of extreme hardness was felt four inches from the orifice of the urethra. The treatment consisted in laying open the abscess in the median line which was found to communicate with the urethra by an old sinus, and incising the scrotum. The urine escaped both ways. The after-treatment consisted in the introduction of bougies in increasing sizes. I found, however, the stricture to be of a very undilatable nature, and as dilatation was both difficult and painful I ruptured the stricture by Holt's dilator and afterwards passed a No. 12 bougie. The patient subsequently made a good recovery and left the hospital with the scrotal fistula closed. The use of Holt's dilator in this case removed all further difficulty in keeping the urethra free to the passage of a large-sized bougie.

CASE 2.—*Stricture; extravasation of urine; sloughing of the whole of the scrotum; recovery.*

J. M—, æt. 30, was admitted into the Northern Hospital under my care on November 4th, 1867. For several months he has experienced difficulty in passing water and for the last week he has only voided it in drops. Three days before admission, after violently straining, his scrotum began to swell and increased in size to an alarming extent.

On admission to the hospital the whole of the scrotum was gangrenous, and the lower part of the abdomen œdematous. The perinæum was not swollen. A stricture existed four inches from the meatus. The cavity of the right tunica vaginalis was full of fluid, and on the same side there was an inguinal hernia.

Free incisions through the sloughy mass were made. The hydrocele was also punctured. The whole of the scrotum came away, leaving the testicles completely exposed and pendulant. On November 10th there was a discharge of pus from the urethra. Gradual dilatation was subsequently employed. After a very tedious convalescence the patient left the hospital quite well. His testicles, however, were not very comfortably located, the new scrotal receptacle for them formed by granulation being inconveniently limited. In other respects the issue of this case was satisfactory.

CASE 3.—*Stricture; abscess; perineal section; recovery.*

J. B—, seaman, æt. 30, was admitted into the Infirmary under my care on January 11th, 1870. He has had stricture for nine years.

Recently he has been suffering from extreme irritability, his nights especially being much disturbed. The stream of urine has been gradually diminishing in size.

On admission into the Infirmary the bladder was found distended, the urine issuing incontinently in drops. There was a perineal swelling, with an indistinct sensation of fluctuation. The stricture was at the membranous portion of the urethra. The patient had had a rigor two days previously. As extravasation of urine was imminent I had the patient placed in the lithotomy position, and putting my index finger in the rectum I introduced a long straight finger knife into the median raphe an inch in front of the anus, and from the apex of the prostate gland divided in a direction forwards all the indurated and infiltrated tissues of the perinæum. This gave vent to some pus and a considerable gush of urine. I was then enabled to pass a centrally grooved staff into the bladder and to complete the division of the stricture. There was no bleeding to speak of. I retained an elastic catheter in the bladder for some hours and then removed it, allowing the urine to escape both by the urethra and through the perinæum. The after-treatment consisted in the introduction of bougies at regular intervals. The patient left the Infirmary on February 1st with the perineal wound completely closed, and No. 12 bougie passing readily.

CASE 4.—*Gonorrhœa; perineal abscess; incision; recovery.*

Benjamin C—, plumber, æt. 24, was admitted into the Royal Infirmary under my care on May 25th, 1874.

Ten days before admission the patient contracted a gonorrhœa, for which he appears to have been treated by medicine and injection.

For the last two or three days he has found great difficulty in passing water, which he attributes to the formation of a swelling behind the scrotum.

On admission the perinæum was swollen and tense. There was almost complete retention of urine. I opened the abscess freely by a median incision, giving vent to a small quantity of pus. No urine passed through the wound though the course of the urethra was exposed.

The incision soon closed up, and the patient left the Infirmary on June 1st, there being no stricture detectible.

CASE 5.—*Traumatic stricture; extravasation of urine; perineal section; recovery.*

Charles W—, æt. 30, was admitted into the Infirmary under my care on September 30th, 1875.

The patient, when about ten years old, fell on an iron rail, injuring his perinæum. A stricture followed and was treated in the usual manner, but ever since he has suffered from severe attacks of retention requiring catheterism. About five years ago he had an attack of gonorrhœa, since which his stricture has been worse and retention of urine more frequent. A week before admission had increased difficulty, passing his urine in drops and with much pain. On September 30th, in violently straining to make water, he felt something give way, accompanied with an immediate sensation of relief. This was followed by rapid swelling of the scrotum, extending to the abdomen. He was then removed to the Infirmary. The perinæum and scrotum were enormously swollen, the swelling extending upwards to the abdomen. The bladder, apparently, did not contain much water. The patient was placed under the influence of ether, when the perinæum was freely incised, the urethra being opened on a staff so as to ensure the complete division of the stricture. Free incisions were also made in several directions into the scrotum. A No. 8 elastic bougie was put into the bladder through the urethra and retained. The urine continued to escape partly through the catheter and some through the wound. On the following day it was found necessary to make further incisions on either side of the abdomen, the urine having passed upwards almost to a level with the umbilicus. At the expiration of forty-eight hours the catheter was removed, but it was found necessary to replace it, the patient being unable to pass urine without it. There was no difficulty in putting a full-sized catheter into the bladder, so that I apprehended the inability to pass water was due partly to the previous over-distension of the bladder, and partly to the damaged condition of the abdominal muscles which rendered any voluntary propulsive efforts on the part of the patient exceedingly painful. It was not until the abdominal wounds began to fill up with granulation that the patient recovered the power of micturition. A considerable portion of the scrotum mortified and large sloughs of cellular tissue were discharged through the incisions in the abdominal walls.

The patient made a good recovery and left the Infirmary on November 22nd. The wound in the perinæum and the other incisions closed up. At the time of his leaving the Infirmary a full-sized bougie passed readily.

CASE 6.—*Stricture; phymosis; extravasation of urine; circumcision; incision; convalescence.*

Joseph T—, æt. 43, engine-driver, came into the Infirmary under my care on October 17th, 1875.

About ten years previously he was suddenly attacked with retention of urine, which was relieved by catheterism. Since this the patient does not appear to have suffered from the usual symptoms of stricture. He has, however, experienced difficulty in passing water which he attributed to a congenital phymosis. Seven days before the patient's admission to the Infirmary he got very wet on going to his work, and remained the whole day working in the damp. He had difficulty in passing his water during this day, and in the evening he found his scrotum much swollen and very painful. This state of affairs remained much about the same during the whole week, at the end of which he applied for admission to the Infirmary.

On admission I found the scrotum and penis considerably swollen and tense, but not discoloured. I could pass, with some difficulty, a No. 4 catheter, the difficulty in passing the instrument being occasioned by a tight phymosis, a contracted urethral meatus, and a stricture at the bulb. There was some perineal induration.

From the history of the case and the condition of the patient on admission I concluded it was one of scrotal œdema, and contented myself with moderately incising the scrotum to relieve the tension. On the following day, though a considerable quantity of fluid had drained away through the incisions, I found the swelling extending and the perinæum full and brawny. Urine was passed with great difficulty owing to the extremely swollen state of the penis and the phymosis, and the latter now proved an obstacle to the introduction of the catheter. As actual extravasation was impending, if it had not already taken place, I laid open the perinæum and the scrotum in several places. I also circumcised the patient, as I thought it possible that some extravasation of urine might be going on from before backward by reason of his phymosis, but on removing the foreskin I could find no evidence of this. In several days the patient passed his urine both by the penis and through the wound The swelling of the parts rapidly subsided and the wounds began to granulate. There was no sloughing either of the skin or of the cellular tissue. The patient made a good recovery so far as his urinary symptoms were concerned, the whole of the wounds, including that in the perinæum, healing up. Bougies were introduced from time to time. Unfortunately the patient was detained in the hospital in consequence of a carbuncular inflammation on his back.

CASE 7.—*Stricture; abscess; perineal section; recovery.*

W. J. D—, æt. 62, was admitted into the Infirmary under my care on October 2nd, 1875.

For thirty-four years he has suffered more or less from stricture consequent on a gonorrhœa. He has been in the habit of passing a bougie and has consequently kept himself tolerably well. A week before admission he had more difficulty in passing water, accompanied with great irritability in the bladder. These symptoms were accompanied with a swelling of the perinæum.

On admission the perinæum was found tense and brawny, and on introducing the finger into the rectum an indistinct feeling of fluctuation was perceived. The swelling had not involved the scrotum. On introducing a catheter (No. 4) into the bladder the urethra was found tightly obstructed in its membranous portion. As extravasation of urine appeared imminent, I laid open the perinæum, taking care to divide the stricture, which was usually tense and resisting. The complete division of the stricture was readily accomplished, as a small staff could be passed into the bladder. An elastic catheter was retained for twelve hours. The patient made a good recovery and left the Infirmary on November 13th, the treatment consisting in the occasional introduction of bougies, whilst the perinæum was closing up.

The perineal wound had not quite closed up at the time the patient left the Infirmary, but urine had ceased to flow through it.

Case 8.—*Traumatic stricture; extravasation of urine; perineal section; recovery.*

John C—, æt. 38, sailor, was admitted into the Infirmary under my care on November 18th, 1875.

The patient states that for twenty-two years he has suffered from stricture occasioned by a fall on the perinæum from aloft. For this he has at times undergone treatment by gradual dilatation. Six months previously he had been under treatment, when internal urethrotomy was practised. This was followed by extravasation of urine necessitating a free perineal incision; other incisions in the scrotum and lower part of the abdomen were also made. When the patient left the hospital on this occasion a No. 10 bougie could be passed. The perineal wound did not completely close, and small quantities of urine continued to escape in this way. Since leaving the Infirmary he has been a voyage, during which time he appears to have used no precautions to maintain his improved condition. For some weeks prior to his second admission to the Infirmary his stricture was becoming more contracted, and micturition was effected with difficulty. He also noticed that no urine now escaped through the perineal wound. Twenty-four hours before admission he had a rigor and complete retention. This was rapidly followed by swelling of the perinæum, scrotum, and lower part of the abdomen.

On his admission into the Infirmary, the parts above mentioned were immensely swollen, the scrotum being almost gangrenous. I passed a small catheter (No. 3) and drew off some urine. The patient being etherized I laid open the perinæum and on a staff divided a hard stricture. The perinæum was undermined in several directions. Other incisions in the scrotum and adjacent parts were also made. An elastic catheter was then passed and retained in the bladder The patient remained in a very critical state for several days, the tongue being dry and the pulse small and frequent.

The treatment consisted in a liberal allowance of stimulants, milk, and beef-tea. A hypodermic injection of morphia was given two or three times in the twenty-four hours. Almost the whole of the scrotum sloughed away. The patient is now—December—convalescent.

Case 9.—*Stricture; perineal and supra-pubic abscess; incision; recovery.*

John P—, æt. 48, was admitted into the Infirmary on November 23rd, 1875, under my care.

The patient has suffered for thirty years from stricture consequent on a gonorrhœa. From time to time he has been treated by gradual dilatation, but recently he has neglected to pass a bougie for himself.

For the few days prior to his admission the difficulty in passing water has been very great, and he has also had one or two rigors.

On admission the perinæum was hard and swollen, the scrotum œdematous, and fluctuation could be felt over the lower part of the abdomen. The urine was passed in drops. A No. 5 catheter was passed, which removed a small quantity of fœtid urine. The perinæum was then laid open freely and an incision made over the pubes. This incision gave vent to a quantity of offensive matter. The two openings thus made were found to communicate. The wounds were then washed out thoroughly by carbolic lotion.

On the following day the patient was able to pass his urine naturally, though in a small stream. He was in a very exhausted condition, and required a liberal allowance of stimulants, beef-tea, &c. The patient has continued to progress favorably, and gradual dilatation is now being employed.

For the first week after his admission he remained in a very low typhoid state, and there were grounds for believing that blood poisoning had taken place. The patient made a good recovery.

The cases I have narrated point to the danger there is of abscesses forming in the neighbourhood of the urethra giving rise to extravasation of urine, by communication with the urethra. That this is a frequent cause of extravasation of urine there can be no doubt. The changes that take place behind a tightly contracting stricture favour the production of such abscesses. The urethra behind the stricture becomes dilated, the dilatation affecting chiefly the floor of the canal. In this way a pouch is formed in which urine remains and decomposes: exposed to the constant irritation the tissues around the urethra becomes inflamed, and suppuration occurs, and if not otherwise relieved, the abscess may find its way into the urethra.

In several of the cases I have narrated this actually occurred. The very disastrous consequences that such an event may give rise to render it most important that in all cases of tight stricture both the patient and the practitioner should be on the look out for such formations, and be prepared to act immediately on their appearance. No rule in surgery is more uncompromising than that which requires the use of the knife in the case of all inflammatory swellings in any relation with the urethra. The neglect of this rule in some of the cases I have recorded led to the most disastrous destruction of tissue, and placed the patients in extreme danger of their lives. The risk of a urinary fistula is little to be compared with the terrible damage that extravasation occasions, and should never be taken into consideration.

In the second case, where extravasation had been unrelieved for three days, the whole of the scrotum sloughed away, and it was with the greatest difficulty that a covering for the testicles could be devised. Whilst in contrast to this, in the cases where incision was practised immediately upon the extravasation of urine, the destruction of tissue was slight.

In the cases I have recorded, the various forms of peri-urethral abscess and their complications are sufficiently illustrated.

The treatment adopted may be summarised under three headings. First, in uncomplicated abscess, where extravasation has not occurred, it is sufficient to provide, by an incision, a free outlet for the contents of the abscess, or even it may be stated that in inflammatory swellings in this position it is proper to anticipate by incision the formation of matter. Little reliance can be placed on fluctuation in abscesses occurring in the perinæum, as by reason of their depth and their relation to fascia it is at all times difficult to determine.

In the second class of cases, where extravasation has actually taken place, treatment should be prompt and bold. Nothing less than a free escape for the urine from the bladder, and wherever it has been extravasated, must be provided. Where the extravasation proceeds from the perineal portion of the urethra this is best done by putting the patient at the edge of a bed and retaining him in the lithotomy position. The index finger of the left hand being placed in the rectum, a straight knife is plunged into the perinæum in the median raphé. The point of the knife should be carried to the apex of the prostate gland. The strictures in front of the knife towards the scrotum can then be divided as far forwards as may be considered necessary. If this proceeding is executed with boldness and precision, the urethra cannot fail being opened behind the stricture. It is important to keep the incision throughout exactly in the median line, as any deviation from this, in consequence of its depth, may be attended with troublesome hæmorrhage. When this rule is adhered to, hæmorrhage is inconsiderable. Other incisions must also be made wherever urine has been infiltrated, the most common positions being the scrotum, the dorsum of the penis, the prepuce, and the anterior surface of the abdomen. In one of the cases recorded, urine made its way up to a level with the umbilicus.

In the third class of cases, perineal section or division of the stricture was superadded to the preceding. This was done in four of the cases related, in each of which the stricture was exceedingly resisting. This preceeding can only be satisfactorily accomplished where a grooved staff or a bougie can be passed into the bladder. I have noticed that in some cases, where it has been found impossible to get an instrument into the bladder, that the difficulty has been in a measure removed when the perinæum has been opened behind the stricture, as I have previously described. In two of the cases, after this had been first done, I was then able to pass a grooved staff into the bladder, and so assure myself of the complete division of the whole of the stricture. I presume that the perineal incision relieves tension and so facilitates the introduction of an instrument. I prefer, where perineal section has been practised, retaining an elastic catheter in the bladder for some hours afterwards, as it allows the divided tissues to become coated over.

In the future management of these cases it is most important that the strictest cleanliness should be insisted upon. Where there is much sloughing the wounds are necessarily offensive, and much care is required to keep them sweet They should be syringed out regularly with tepid carbolic lotion of the strength of one part of acid to sixty of water. Poultices are the best application during the separation of the sloughs, and after this water dressing or some stimulating lotion. Where there has been much sloughing of the scrotum, advantage may be gained after the sloughs have separated by drawing the parts together by strapping.

In insisting upon the strictest attention to general hygienic measures, it must be remembered that septicæmia and pyæmia are the more frequent causes of death in these operations. That sickly urinous smell which so often hangs about the apartment and appointments of the urinary invalid is not uncommonly due to a want of cleanliness on the part of the patient or his attendant.*

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* In keeping the bed of the patient sweet I have found a very simple contrivance, which was first suggested to me by Mr. Long, exceedingly useful. It consists in placing in the patient's bed a perforated wooden pill-box, containing a dozen grains or so of pure iodine.

The ventilation of the apartment must be carefully seen to; remembering that cold, by checking the action of the skin, invariably increases the distress of the patient suffering from a urinary complaint. Where there has been much damage done by extravasated urine, the patients are apt to pass into a low typhoid state. When the pulse and dry state of the tongue indicate this, stimulants and highly nutritious fluid foods are required. In one or two of the cases recorded the danger from this condition was great. That nervous irritability which so frequently is observed in these cases, I have found best relieved by small doses of morphia hypodermically administered.

In concluding these observations, I have to thank one of my dressers, Mr. W. B. Hadden, for much assistance in drawing up and arranging my cases.

NOTES ON SURGERY.

BY S. MESSENGER BRADLEY, F.R.C.S.

Popliteal aneurism; ligature of femoral artery; gangrene of limb; septicæmia; amputation of thigh; death.

Thomas F—, brewer's drayman, æt. 40, admitted into Manchester Infirmary October 4th, 1875.

A fortnight before admission had been struck on outer side of right knee by a beer barrel and crushed against the wall. He experienced a good deal of pain at the time, but continued to work for a week, when, on account of increasing pain, he applied as an out-patient at the Infirmary, and was admitted into hospital on October 4th. He had been a heavy drinker for twenty years, but did not look unhealthy. Fifteen years before admission he had had a sore on the penis, followed by a suppurating gland in the groin, but had never suffered from sore throat, any cutaneous eruption, or other evidences of syphilitic infection. The cicatrix of the chancre was still visible but quite soft, and the inguinal glands did not seem to be larger on one side than the other.

There was a popliteal aneurism on the right side as large as an orange, soft to the touch, and possessing a marked thrill. A tourniquet was at once applied to the femoral, and pressure, which he bore very well, was continued without intermission for four days, but at the expiration of this time the aneurism was found to be larger, and apparently thinner walled than at the commencement of treatment; and on a consultation being held it was decided to tie the femoral. A sphygmographic tracing was taken of the pulse, which showed in a marked manner arterial degeneration, the ascent being inclined, the summit rounded, and the descent delayed; still the aneurism showed such a tendency to become diffused that it was considered best to ligature the vessel. The artery was accordingly tied on October 8th with a cat-gut ligature, at the apex of Scarpa's triangle, under the carbolic spray, Mr. Lund kindly superintending the carrying out of the antiseptic method on this and on each subsequent occasion of dressing. After the operation, the limb was enveloped in flannel and cotton wool, and on recovering consciousness he stated that all pain had left his ham, though he suffered much during the day from pain in the leg and foot.

The following day, October 9th, he was very comfortable, and had slept well. Temp. 99·6°, pulse 100.

The dressings were removed the second day, October 10th, when all appeared going on well. A clot lay over the incision which, without having undergone any putrefactive change, was already beginning to show signs of organisation. The leg was warm, but the tips of the toes were blue and numb.

11th.—Looking and feeling well. Temp. 100°, pulse 100. Toes deepening in colour.

On October 12th, the dressings were again changed under the carbolic spray, and all looked well; the line of demarcation already beginning to appear at the base of the toes.

When I saw him the following morning, October 13th, it was evident that some calamitous change had taken place. He had had a rigor the previous evening, and the temperature suddenly rose from 100° to 104·5°. At the time of my visit it was 105°, and the pulse 140. He had been sweating profusely all night, and looked pinched and anxious. The legs, however, felt warm, and sphacelus still seemed limited to the toes. He was ordered ten grains of quinine, to be followed by two grains every four hours and as much brandy as was necessary.

The following day all the bad symptoms had increased, and it was now evident that gangrene was rapidly spreading up the leg. Large phlyctenulæ lay on the calf and knee, and there was crepitation not only up to the point of deligation, but even on to the front of the abdomen, where the veins looked turgid and tortuous. Though a forlorn hope, it was decided to remove the limb, and amputation was accordingly forthwith performed just above the situation where the artery was tied. His pain, which had been excessive, was relieved by the operation, but septicæmia was not for a moment arrested, and he sank on October 16th, two days after the limb was removed.

On *post-mortem* examination, the heart and arteries were found to be in an advanced stage of atheroma; there was a fusiform aneurism of the left subclavian, and the femoral artery, on the diseased side, in addition to the large popliteal aneurism, was the seat of two small succular dilatations a few inches higher up. The sac of the aneurism was filled with soft clot, which showed no attempt at lamination. The ligature, which still firmly clasped the artery, was apparently making its way through its coats, though from a very careful examination that I made I came to the conclusion that this was not due to any ulcerative process, but to the ligature having, at the moment of deligation, partially cut its way through the unnaturally brittle coats. Slight adhesive inflammation was going on around the ligature, though it looked doubtful whether it would have proceeded so far as to completely occlude the vessels. A small ragged clot lay just above the constriction, below there was nothing but fluid blood. The popliteal vein was flattened and closely compressed by the tumour. The liver and kidneys bore the marks of several small puckered cicatrices, and the latter organs were in a state of advanced fatty degeneration.

Remarks.—The first question that arises is to what was the atheroma attributable in this case? It was clearly a later stage of arteritis, rather than a primary degeneration, or senile change, and must have been due either to syphilis or alcohol, as there is no other cause competent to produce all the pathological changes revealed by death. Now, alcohol may very possibly produce arteritis, which was unquestionably the precursor in this case of degenerative change, and we know that he was an old toper, while the history which he gave of his venereal attacks rather points to a soft suppurating sore than to an infecting chancre.

On the other hand, alcohol alone could not have produced the cicatrices which were so prominent on the liver and kidneys. Alcohol may produce a chronic inflammation of these organs, or of the cellular tissue of these organs; that is however always diffuse, never patchy, but syphilis would quite rationally explain, and could alone explain, the condition at the same time of his viscera and his vessels. I hesitate the less in attributing the entire group of pathological conditons in this case to syphilis, inasmuch as I have so repeatedly seen sores apparently soft, non-infecting in character, followed by constitutional symptoms, and indeed have elsewhere argued for the essential unity of the syphilitic virus; nor do I think much of the hiatus which occurred in the apparent absence of secondary affections, as most men who have observed syphilis have seen cases where the initial lesion has been the sole precursor of conditions which all would agree in classing as tertiary manifestations.

Although this case terminated so calamitously, I could not help rejoicing that antisepticity had been thoroughly carried out. So far as the local conditions at the seat of ligature went, nothing could have been more satisfactory: no suppuration, no discharge, a perfectly clean and healing wound. I could not help contrasting the state of things with a case which I had had in the summer, of ligature of the third part of the subclavian. The patient was a female, of forty, who some months before had undergone an excision of the elbow for strumous arthritis. The woman was very delicate and the case did badly, amputation had to be resorted to; and when, after this, she came into the Manchester Infirmary, the arm had to be reamputated for disease in the stump; secondary hæmorrhage followed this operation on the fourth, fifth, and sixth days, and on the last occassion I tied the subclavian artery in the third part of its course, which effectually put a stop to further hæmorrhage. An ordinary hemp ligature was used, and the vessel was exposed without any antiseptic precautions. She improved somewhat up to the fifth day following the deligation of the artery, though the stump was all along sloughy and the recuperative efforts were but slender: then she had a rigor, and she quickly sank, with symptoms of acute pyæmia.

I do not say, for I do not think, that the termination of this case would have been altered by employing a cat-gut instead of a hempen ligature, but I could not help contrasting the different progress of the two cases so far as the local changes were concerned. In the former, clean and pleasant healing by the first intention: in the latter, a bag of matter filled the wound and came into almost immediate contact with the pleura. Most certain it seems to me that in the present state of our knowledge it is the bounden duty of the surgeon to employ antisepticity in the ligature of arteries.

It matters nothing that some cases do well enough without all the trouble of antiseptic dressing. If such arguments were of weight, I might boast of a case which occurred in August, and which I saw in consultation with Mr. R. B. Smart, where I tied the anterior tibial artery of a little girl who had fallen over some broken glass and deeply cut her leg, and which, in spite of the large incision necessary to expose the vessel, healed in a few days, with scarcely any pyrexia, the only dressing used being wet lint; but, in my opinion, such arguments are not of weight, and such cases do not prove anything, inasmuch as without antisepticity we find putrefactive changes occur from time to time, do what we will, while the followers of Lister are able to assert, that with strict antiseptic principles they never occur, and indeed they confidently defy them to do so.

Foreign body (plum-stone) in left bronchus; tracheotomy; subsequent expulsion of stone; slow recovery.

Agnes D—, æt. 17, came into hospital on August 9th, 1875, having laughed a plum-stone down the wrong way the day before.

When I saw her on the afternoon of the 9th, there was a good deal of pain about the bifurcation of the trachea, but no great dyspnœa. Percussion yielded a clear note over both lungs, but the respiratory murmur was quite absent on the left side. This condition, coupled with the history, left no doubt as to the presence of a foreign body in the left bronchus, and I accordingly proceeded at once to perform tracheotomy. I experienced considerable difficulty in the operation, owing to the unusual depth of the trachea, which was eventually opened two inches from the surface of the skin. Three rings were divided, and the edges of the wound held apart, but we failed to excite any violent expulsive, or even forcible expiratory effort, and as the surface of the body was at this time cyanotic, and there was a good deal of mucus about the tracheal opening, I was reluctantly compelled to introduce a tube without having relieved her of the stone. She was very ill all day after the operation, and in the evening the surface was clammy, the lips and skin blue, and the countenance expressive of much distress.

The following day her general condition had much improved, and I find in my notebook the following record:

"August 10th.—Had slept well; no dyspnœa; cyanosis gone; faintest possible respiratory murmur audible over left lung; no cough, but moist râles over right lung."

On August 11th the respirations were 18 per minute, and the temperature was 103°. There was scarcely any cyanosis and no dyspnœa, although the left lung was now completely blocked, and moist râles audible all over the right side. The tube was removed, and Mr. Lund and I together inverted and succussed her freely, but without expelling the stone, though it was evidently stirred, as on replacing her in bed it was found that air entered the left lung freely, while the right was completely blocked.

The next day, August 12th, the tube was again removed, and we made a most determined search for the stone. After vainly trying suspension and succussion, the tracheal forceps were employed, Mr. Lund and Mr. Bowring both kindly assisting me to hunt for the stone. After trying for a long time, to the poor girl's very great distress, we desisted, and replaced her in bed. Another movement had occurred during these manœuvres, as air was now heard entering the upper lobe only of the right lung, but entering everywhere on the left. After this attempt the tube was not replaced, as it was hoped that the stone might be dislodged by the mucus which its presence would probably excite, and that it would be expelled during some fit of coughing, which had now become somewhat troublesome. Nothing of this kind, however, occurred; she grew daily worse, until, on August 16th, she was in almost a dying condition. Her prostration at this time was extreme. The temperature, which had been gradually rising, was now 105°, and the pulse, very feeble, 150. Râles were heard over both lungs, and the dyspnœa was most distressing.

On my visit the following day, August 17th, however, the nurse met me with smiles, and handed to me, with many congratulations and a good deal of cotton-wool, the cause of all the trouble. I then learnt that five minutes after my leaving the previous day a fit of coughing had come on, during which she suddenly coughed up the plum-stone. The future progress of the case was very slow, though it need not be given in detail; the operation itself, or the stone during its residence in the air-passages, had done sufficient mischief to for some time imperil the girl's life. She went through a bad attack of double pleuro-pneumonia, and after recovering from this had a smart pleuritis on the right side, from which she very slowly rallied. The wound was dressed from first to last with carbolized gauze, but it was not until September 24th that the tracheal opening was completely healed, and it was only after a fortnight's sojourn at the sea-side, whither she went October 9th, that she quite recovered her health and strength.

Great care was taken throughout the entire case to maintain an equal moist temperature of 80° Fahr.

Remarks.—Although tracheotomy in this case only added another element of danger to the girl's life, as the foreign body eventually returned through the same passage by which it entered, yet statistics sufficiently prove that it is the best and safest plan to open the windpipe in all such cases: of course, the hope being that the foreign body will be expelled through the tracheal opening at the time of operation. In order to facilitate such a result it is perhaps advisable to pass a silver ligature through either edge of the divided trachea, and holding the sides well apart, then and there to invert and succuss the patient. If a case of this kind were again to present itself, this is certainly the plan which I should adopt.

Cheloid of face developing into epithelioma; cured by repeated applications of Potassa Fusa cum Calce.

John C—, æt. 30, clerk, consulted me in the spring of 1875 about a cutaneous affection from which he had suffered for many years.

He was a little, dark man, with no evidence of struma or any particular cachexia. His mouth on the right side was drawn down at the angle, and the neighbouring portion of neck scarred exactly as by cicatrices of old burns. On the right cheek there were congeries of large tubercles springing from a slightly elevated cheloid growth, round which the skin was puckered as on the neck. On the back of the neck there were two small but similar cheloid growths. He informed me that he had had a skin disease for over twenty years, but that it was only within the last two months that it had assumed its present warty form; it had previously been elevated and smooth, with claw-like processes extending on to the sides of the cheek, but there were no tubercles till the time specified. He experienced occasional sharp stabbing pains, and felt the mouth a good deal drawn, but his general health was good, and there was no history of any cancerous affection having been seen in the family. I resolved to attack the mass with a powerful caustic, and accordingly there and then I rubbed the greater part of the tubercular growth clean away with a stick of Potassa fusa cum Calce. He suffered a good deal of burning pain for an hour or two, but finding that there were some of the tubercles still left with hard bases, I attacked them again in the same manner the following day.

When the sloughs separated I found that wherever the caustic had penetrated most deeply it had left a healthy surface, but where it had failed to eat through the gristly base a fungating growth developed with great rapidity. I examined sections of the tubercles from time to time under the microscope, and never failed to find the peculiar bird-nest formations so characteristic of epithelioma. Time after time the application of the caustic had to be renewed. In all I used it twenty times; but after the last application the tubercles no longer appeared, and the ulcer remained perfectly healthy until it healed under simple cerates, a fillip being occasionally given by planting it with a few grafts. He took five minims of Fowler's solution three times a day during the whole course of treatment, and the general condition of the neck seemed somewhat to improve under this remedy. The ulcer has now—December, 1875—been healed for more than a month, and there is no sign of any reappearance of the epithelioma or the cheloid.

Remarks.—Alibert, who was the first to describe cheloid, which he did under the name of *cancroides*, pointed out the close affinity that the disease bears to epithelioma: "Par un double rapport les cancroides semblent se lier aux affections dartreuses et aux affections cancéreuses," and immediately after asks, "fournir aient-elles un genre intermédiaire?" I am not, however, aware that any case has hitherto been recorded where unmistakable cheloid has merged into unmistakable epithelioma, as happened with this man. For twenty years this patient had suffered from cheloid, without it showing any marked tendency to spread or change its character; but suddenly, and without assignable cause, it sprouts and spreads, and evolves an unmistakable crop of epitheliomatous warts. The treatment was so satisfactory that I should certainly pursue a similar course in a similar case.

Hydrocele of tunica vaginalis and encysted hydrocele of cord, treated by repeated tappings and by tapping and injection of iodine; suppuration of sac and septicæmia; sac laid open; abatement of symptoms; rigors; return of septicæmia; death.

Death following an operation upon a hydrocele is sufficiently rare and sufficiently alarming to warrant noting.

A. K—, railway-porter, æt. 48, had suffered from a large hydrocele for several years, and came under my care as an out-patient at the Manchester Infirmary in May, 1875.

He had often been tapped, and sometimes the sac had been injected with iodine, but he informed me that it always quickly refilled. I followed my leader and tapped him again, but in a fortnight it was as big as ever. I now tapped the sac, injected it with iodine, and then strapped it as tightly as possible with Emplastrum Saponis, but all to no purpose; so after a good many failures I admitted him into the wards of the hospital, in the hope that daily supervision might effect a cure. Soon after his admission I tapped him once more, and injected a drachm of equal parts of Tinct. iod. and water. On emptying the sac I, now for the first time, found that there was a second sac (encysted hydrocele) situated on the cord: this I also emptied and injected. Acute inflammation followed, and in three days the scrotum was brawny, with evidence of deep-seated fluctuation. He had had a rigor in the night, followed by a profuse sweat, so I immediately laid the sac open, under chloroform, from top to bottom, and stuffed it with lint soaked in carbolized oil. The sac was filled with shreds of lymph and fœtid pus, and the walls were half an inch thick, which I suppose explained the difficulty of effecting obliteration of the sac. The symptoms were much and immediately relieved by this treatment, and the wound began to granulate healthily; but on the fourth day diarrhœa set in, followed by a violent rigor. This train of symptoms soon ushered in a return of septicæmia with high nocturnal temperature, profuse perspiration, and frequent fluttering pulse, death following on the eighth day after the sac had been laid open.

Remarks.—Although this case was, I believe, due more to the condition of the hospital at the time than to anything else, yet it shows that risk does attend such an apparently safe procedure as tapping a hydrocele.

Hysteria simulating acquired talipes varus, cured by galvanism.

Jane L—, æt. 17, a soldier's daughter, came under my care as an out-patient at the Infirmary in June, 1875.

She was a healthy-looking, florid-complexioned, well-nourished girl, and menstruated naturally and regularly. The mother informed me that for some months the girl had limped in walking, and that the left leg had been gradually wasting up to the date of her admission as an out-patient.

On examination, I found the left leg notably smaller than the right, and that the foot on the affected side was inverted and œdematous. The entire limb was blue in colour and cold to the touch. (I should here state that on this and every subsequent occasion when it was examined the spine gave negative evidence.) She was Faradized twice a week, and took a variety of nervine tonics, while directions were given for the limb to be diligently shampooed every morning. In spite of all that was done, the talipes became more and more aggravated, and the limb continued to waste until a month after I first saw her. It measured three inches less than its fellow round the calf. Locomotion became so difficult at last that I resolved to send her into the hospital, and accordingly she was made an in-patient on July 25th, 1875.

The further history of the case is very interesting, but may be briefly told. She was seen by the house-physician, Mr. Walker, the following day, who, making a more careful investigation of the case than is possible amidst the hurry and bustle of the out-patient room, inclined to the belief that the girl was suffering from hysteria. Though I do not think he at this date attributed the talipes to this origin, yet he wisely resolved to leave no hinge to hang a doubt upon as to the share which hysteria had in the matter, and forthwith gave her such a dose of the interrupted current as to make her dance, and with such effect that after two or three repetitions of this remedy she was able to dance without it. I never saw anything more remarkable than the change which this treatment and a week's residence in hospital made in her condition. At the expiration of this period she could plant the sole and heel on the ground and walk without a limp. The calf muscles began to grow again, the blue colour to disappear, and the temperature of the two limbs became equal. At the end of a fortnight the girl was perfectly restored to health, and was appointed a nurse in the hospital, in which capacity she has continued up to the present time.

Remarks.—I have seen many cases of nervous or hysterical mimicry of disease, but never anything so marked as this. The difference in size, colour, and temperature, the pitting of the limb on pressure, and the considerable and increasing degree of club foot, and all this in an apparently healthy girl who seemed quite fancy free, threw me off my guard, and no suspicion of hysteria ever flashed across my mind, or across the minds of others who saw her from time to time. It is due to Mr. Walker, however, to say that he seems to have suspected hysteria at his first interview, and there and then applied a remedy which proved curative in a very short space of time.

Treatment of buboes.

The plan which I adopt in the treatment of the various kinds of bubo is as follows:

The multiple bubo which follows an infecting chancre.—No local treatment is of the slightest service in this class of cases, nor need this be a matter for regret, as the internal (or other) exhibition of mercury is all powerful in removing the inguinal adenopathy.

The bubon d'emblée.—Precisely the same remarks apply to this as to the first kind of bubo.

The virulent bubo, which accompanies a soft chancre or sometimes a mixed sore.—As this variety of bubo inevitably tends to suppuration it is best to hasten the progress thitherwards by warm fomentations and poultices, and by encouraging the patient to take exercise if this can be borne. The abscess should not be opened on the first detection of deep fluctuation, but suppuration should be allowed to proceed until the skin is somewhat thin and glazed; then the abscess should be opened freely along the entire length of the gland, and the cavity washed out night and morning with Tinct. iod. 1 part and water 2 parts, and dressed afterwards with lint soaked in an astringent lotion. Exercise should now be very restricted, and any sinus which appears should be at once followed up and treated like the large abscess.

The blue overhanging edges of the incision, which are such common features in this form of bubo, are best destroyed with some caustic: none better for the purpose than Potassa Fusa cum Calce. It not unfrequently happens, however, that the gland itself assumes all the characters of a suppurating chancre; and if this should be so there is no application so generally useful as iodoform. What Lancereaux says of the value of iodoform in the treatment of the soft chancre will almost *mutatis mutandis* apply to the virulent bubo with an ulcerated gland. "Cette substance, dont l' usage est recent, peut être regardée en quelque sorte comme le spécifique de ce chancre, dont elle favorise la cicatrization et amène sûrement la guérison sans occasionner la moindre douleur. Je possède plusieurs faits qui ne laissent aucune donte à cet égard. Le chancre, saupoudré avec la poudre fine de l'iodoforme, cesse de s'étendre, puis au bout de quelques jours la couche grisâtre qui le recouvre disparait, des bourgeons charnus apparaissent, la plaie spécifique est transformée en une plaie simple qui ne tarde pas à se cicatriser. L' idoforme détruit, sans aucune doute, les germes ou organismes qui constituent et entretiennent le chancre vénérien."

It is a good plan to give a grain of iodoform internally three times a day, combined if other things indicate it with a grain of reduced iron, while using it as a local remedy.

The sympathetic bubo.—This bubo may accompany a gonorrhœa, or a soft chancre, or may be caused by a tight boot, or it may be more directly traumatic in origin, but the treatment is not affected by the diversity of its cause. This variety of bubo is, in a word, a simple adenitis, sometimes terminating in resolution, sometimes going on to suppuration, and the object of treatment is at first to produce resolution, and next, if this is impossible, to promote suppuration. The best mode of proceeding with these cases is to apply a compress of lint soaked in a strong lead and spirit lotion, and kept in firm contact with the groin by a tightly drawn spica bandage or well-fitting truss. Rest is also an essential element in the treatment. If in spite of this the gland continues to enlarge, though without much pain or any throbbing, I am in the habit of injecting five or six minims of the simple tincture of iodine into the very substance of the gland, and very generally find that this treatment either succeeds in dispersing the tumour, or so accelerates suppuration as to make very quick work of the resultant abscess. In cases where the gland becomes very large and very hard this plan is much better than mere blistering, or than the application of a solution of the mercuric chloride to a previously blistered surface. When suppuration has taken place the abscess should be freely and early opened, and the patient enjoined to rest, and syringe the sac of the abscess twice a day with some stimulating lotion. The injections of iodine may, if necessary, be repeated twice or thrice a week.

Syphilitic Infection.

There are two theories of the physiology of syphilitic infection. The English school, influenced in a great measure by the teachings of Henry Lee, embrace the one, which argues that the virus enters the system and continues to operate through the medium of the blood-vessels. The second theory is that it is by the lymphatics alone that the work is done, and this is in a great measure the belief of the American school, guided by the writings of Fessenden N. Otis. It appears to me that neither is wholly in the right, though neither is entirely in the wrong: the evidence pointing rather to show that both channels are operating though at different periods of time; that, in other words, it is by the lymphatics that the virus gains an entrance, but it is by the blood-vessels that it makes good its residence in the system. The arguments in favour of this view seem to be as follows:

Chauveau and Burdon Sanderson have both demonstrated the remarkable fact, that if certain septic liquids taken from an animal suffering from some zymotic disease be filtered through porcelain that the liquid so filtered is innocuous if injected into the veins of a living animal, but that the solid residue, which is composed of bacteria, is capable of producing the original disease from which the animal whence the liquid was obtained suffered. This fact, taken in connection with the asserted discovery by Lostorfer of a peculiar syphilitic cell, seems to me well worthy of notice. It is true that much doubt has been thrown upon this alleged discovery by subsequent observers, who allege that this so-called syphilitic cell is by no means peculiar to syphilis, but is met with in various other morbid conditions, and even in a state of health. This identity, however, of Lostorfer's cell with the cells or bodies subsequently noted in other diseases, is not by any means certain, nor in the present state of knowledge, and with our present means of research, does it seem capable of proof, inasmuch as it entirely depends upon an instrument, the microscope, which is clearly incompetent to decide the question. To the microscope many cells, notably embryonic cells, appear quite similar, and indeed identical, which yet have a widely different life history; and in pathological growths the same remark holds good, many totally different structures possessing cells which are undistinguishable from each other by the microscope. This being so, it follows that the existence of a syphilitic cell peculiar to the poison is by no means upset by the detection of apparently identical bodies in diseases non-syphilitic. Assuming, for the moment, the veritable existence of such a cell, and further, that it partakes of the nature of bacteria, let us see, guided by our knowledge of syphilitic phenomena, what train of symptoms would arise on its introduction into the system by (α) the blood-vessels and (β) the lymphatics.

Now, one of the most striking properties of bacteria, and allied organisms, is the marvellous rapidity with which they reproduce themselves, one organism, *e. g.* producing some millions like itself in the course of twenty-four hours by fissiparous division. It follows from this that if the syphilitic cell be of this character, and introduced directly into the blood current, that the characteristic symptoms of syphilis would develop with great rapidity, and indeed that the disease would run its course like other zymotics when the blood is primarily affected, as variola, scarlatina, and so on, in a few days, or at most a few weeks. Nor are we limited to speculation alone as to what would ensue, but have the firmer ground of experimental evidence to fall back upon. Some years ago, when experimenting upon the unity or duality of the syphilitic virus, I introduced some scraping from an indurated chancre into the jugular vein of a guinea-pig. A fortnight afterwards I killed it, and found what I believed and still believe to be gummatous exudations in the liver and kidneys. How different to this such a course, is the actual career which syphilis runs. Let us turn, then, to consider in what way the progress of the disease would be modified if it entered the system through the lymphatic vessels. If this were the channel of infection, we should expect the cells to pass without let or hindrance along the lymph paths to the nearest gland, when a temporary arrest would take place owing to the poison germs becoming entangled in the parenchymatous meshes of the gland itself. Here the cells would multiply, and after a time, by the exercise of amœboid movements akin to those enjoyed by the leucocytes, and which probably all living masses of protoplasm possess, some of them would reach the gland next in order, when a similar course would be pursued, and so on, the glands of course increasing in size with the increase in number of their guests, until the whole chain became loaded with the poison germs: a time would then come when some of the germs would pass on into the farther lymph current, by which they would be conducted to distant parts, affecting other glands in their progress, but certainly at some time reaching the thoracic duct, and so at last being emptied into the circulation, when we should expect a fresh and more general group of symptoms to manifest themselves.

Let us now glance at the actual course of an ordinary attack of syphilis, and see how far we can reconcile the phenomena with *this* mode of invasion. After a varying period, the average being about twenty-one days, during which nothing whatever is observed, the surface which has received the poison becomes abraded, while a hard base appears and increases beneath the sore. A short pause, followed by multiple inguinal adenopathy, ensues; then a longer pause, and after this the throat ulcerates and an eruption appears upon the skin: every tissue and viscera in the body becoming liable in time to some syphilitic affection. What is the explanation of this chain of symptoms, on the assumption of the existence of a syphilitic cell, and of its entering the system by the lymphatics? It appears to me that the course of events may be explained as follows: The poison germs are at first lodged upon the unbroken skin, or on the surface of some abrasion. Here they lodge and multiply, and by their presence give rise to the exudation of some inflammatory lymph, in which they for a time remain stationary. The nutrition of the part is so affected that molecular death takes places at the surface, and some of the germs are cast off in the resultant ulcer, while others are carried by the lymphatic vessels to the inguinal glands, where they give rise to enlargement and induration in the way before described; here they remain for some time, but eventually some .of them sail away, and ere long fall into the blood current, when their presence gives rise to general pyrexia and to the malaise of syphilitic fever, which ushers in the secondary symptoms. Much of the poison, however, continues to circulate by the lymphatic vessels, and so produces the tonsillar affection, the tonsils being but a congeries of lymphatics, and the posterior cervical adenopathy, which is such a common affection. The virus in the blood nearly always excites some skin disease, the various cutaneous syphilides being so many efforts on the part of the blood vascular system to eliminate the poison. After a time, the patient becomes more tolerant of the virus, though it is long before it dies completely away and loses its power; ever and anon it seems to gather fresh strength, and then gives rise to some fresh symptom or group of symptoms, every organ in the body being liable to its attacks as every organ in the body is washed by the current of the blood. That it does eventually invade the blood is placed beyond dispute, as we have now several perfectly well-authenticated cases of syphilis following an inoculation with the blood of a person suffering from constitutional syphilis. Such seems to me the most rational theory by which to explain the general phenomena of syphilitic infection, and as such I submit it to the verdict of the profession.

ON RARE INJURIES OF THE EYES.

BY T. SHADFORD WALKER,
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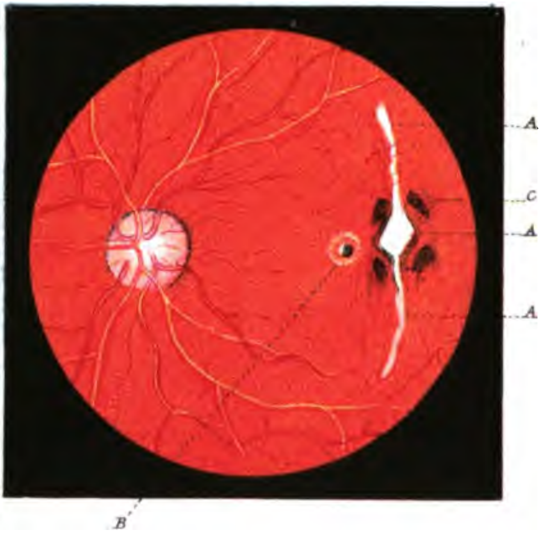
THE two following cases are sufficiently rare and interesting to merit record. I have therefore thought it desirable to describe their most important symptoms and appearances, and at the same time to accompany each with a drawing, which will, I trust, render the description more intelligible.

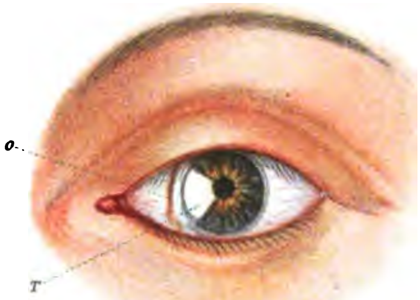
Both cases were the result of injury, which in the one case spent its force on the anterior part of the eye, and in the other on the posterior. The first recovered completely; the second sustained a partial but permanent impairment of vision.

In the one there remains no external trace of the accident which caused it; in the other, examination with the unaided eye would lead to the supposition that an iridectomy had been performed very neatly, by the surgeon, without any suspicion of preceding injury.

CASE I.—*Laceration of the central part of the retina and choroid, with limited loss of vision.*

On August 20th, I was consulted by Mr. J. L. K—, for impairment of vision, the result of injury. He gave the following account of the accident and its immediate consequences:—Rather more than a fortnight previous to his calling upon me he was opening a bottle of soda-water somewhat carelessly, when the cork was expelled before he was prepared, and struck him with great violence on the right eyeball. For nearly a week afterwards he suffered great pain in and around the eye, accompanied by profuse lachrymation and intolerance of light. Vision was limited to perception of bright light and large objects, such as the figure of a man. During the ensuing ten days these symptoms gradually abated, and when I saw him first the





W.West & Co. ch. lith.

eye presented the following appearances:—Externally, the only trace of mischief was inability to bear exposure to bright daylight. The iris seemed healthy and acted freely, and the pupil was of normal size and position. He complained of a little difficulty in using the eye and of considerable dimness of vision, more especially in looking at objects placed straight before the eye. There was no external redness or suffusion of conjunctiva or sclerotic.

Ophthalmoscopic appearances.—On examining the parts behind the iris I found the lens quite clear, as also the anterior portion of the vitreous humour. The posterior portion at its *central* point was cloudy. The optic papilla was somewhat hyperæmic, but otherwise presented no abnormal appearance. The retina also, with the exception I am about to mention, appeared healthy and unaffected by the injury. The whole of the mischief seemed concentrated in the immediate neighbourhood of the yellow spot. To the outer side of the macula lutea, and almost in contact with it, there existed a laceration of the retina and choroid down to the sclerotic, which extended above and below as far as the main divisions of the retinal blood-vessels, so as to cross their course. The rent was irregular, being broad in the centre near the macula lutea, and gradually narrowing towards its extremities. Small masses of choroidal pigment could be seen at the outer margin of the central portion of the laceration, and immediately beyond this point. A few small veins crossed the upper limb of the rent, and in two or three places small red patches like blood clots were visible. Everywhere else the white reflection of the sclerotic coat could be seen between the irregular margins of the wound.

I have endeavoured to show as exactly as possible the appearances manifested on ophthalmoscopic examination, in the accompanying diagram, which faithfully exhibits what I think will remain as the permanent condition of this part of the fundus, since there has been no perceptible contraction or other alteration of the wound during the past six or seven weeks (*vide* Plate I. A A A shows line of ruptured portion of retina and choroid; B, macula lutea).

Vision.—When first examined the patient could not read the largest test-types at any distance. When directed to look at articles of furniture he stated that he could only dimly discern what they were, and that only by avoiding looking in the direct line of vision. In the course of September and October the opacity of the vitreous humour disappeared and the blood clots were absorbed, so that he was not obliged to turn the eye so much out of the normal line in observing objects.

When last tested, at the end of November, he could read No. 16 Jaeger at twelve feet, with a little difficulty, and the corresponding size of Snellen's types. Neither these same, nor any larger letters could be read, however, when brought within a distance of two feet, and held in the line of normal vision. The printed sheet then seemed blank to him, and the words could only be read by turning the head on one or other side, so as to look obliquely at the page. He seemed quite indifferent as to the direction in which the eye was turned, and stated, indeed, that he could see equally well whether he looked obliquely inwards or outwards. When so turned, No. 3 Jaeger could be slowly read.

The left eye, which during the three weeks following the accident had suffered from sympathetic weakness and inability to bear ordinary exertion, is now quite free from any sign of debility, and is equal to all the demands which the patient's occupation requires.

CASE 2.—*Traumatic iridectomy, together with dislocation of the lens under the conjunctiva, followed by complete recovery of vision.*

Ann H—, æt. 60, was admitted into the Liverpool Eye Infirmary on March 30th, 1875, under the following circumstances:

Whilst engaged in cooking, her foot slipped and she fell heavily forward, striking the left eyeball with great force against the end of a saucepan handle. The result was an extensive laceration of the sclerotic to the extent of half an inch, about a line from the margin of the cornea on the inner side. The conjunctiva was not torn, but was greatly distended by extravasated blood, aqueous humour, and the crystalline lens, which last had slipped from its natural position and was forced through the sclerotic wound. In addition, the portion of iris equal in extent to rather more than one fourth of the whole, had been torn off and had disappeared. The edges of the remaining portion of iris were so cleanly lacerated that they could not have been more neatly cut by the most expert operator when performing an iridectomy on a perfectly healthy iris, the edges being quite symmetrical. This condition could not, however, be seen until the lapse of five or six days after admission, as the anterior chamber was entirely filled with blood. The cornea was not wounded. Vision was confined to mere perception of the flame of a lamp.

Under careful treatment by the pressure bandage, complete rest, and the instillation of a solution of atrophine twice a day, the wound in the sclerotic closed up, the conjunctival swelling entirely disappeared, and the extravasated blood was absorbed from the anterior and posterior aqueous chambers. This revealed the absence of the lens and the existence of the clearly cut wound in the iris.

The ophthalmoscope showed a normal state of the fundus oculi, but the anterior portion of the vitreous humour contained long strings of dark fibrinous material, evidently the remains of the blood clot. These opacities became gradually smaller, until three months afterwards further ophthalmoscopic examination showed an almost entirely clear condition of the vitreous. Externally there was only a faint line to enable the eye to trace where the wound in the sclerotic had been, and no conjunctival redness or swelling remained.

The vision had been steadily improving, *paripassu*, with the healing of the wounds, and with a cataract glass of two inches and a half focus this patient could read, at the end of three months, No. 1 Jaeger's test-type with ease. Without a glass she could see quite as well as anyone of her age, at the same date after the performance of operation for extraction of senile cataract with iridectomy.

The principal points of interest in this case are the clean manner, simulating operation, in which so large a portion of iris, from the pupillary border to the ciliary insertion, was accidentally removed; the escape of the lens through an extensive laceration of the sclerotic in a part injuries of which are very frequently followed by serious consequences, but which did not occur here in the slightest degree, and the complete recovery of sight (*vide* Plate II. A, the brown line, shows position of wound of sclerotic; B, the part left white, shows position and extent of wound of iris; the remaining portion of iris is coloured naturally). Cases of severe injury to and loss of the iris, to a great extent, occur not infrequently, where good vision results. Similar good fortune may occur where the sclerotic is wounded and also where the lens is dislocated, but we seldom meet with a case where all these injuries are combined, are met with at an advanced age and in a feeble person, and finally where the recovery is so good.

CLINICAL OBSERVATIONS ON A CASE OF EMPYEMA.

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In the 'Practitioner' for September, 1875, I published a series of cases illustrating the value of paracentesis of the chest in the treatment of effusions into the pleural cavity. The results in all the cases were extremely satisfactory, and although the effusion was in most cases of a serous character, there was one case of empyema in which the value of paracentesis was shown in a most marked manner. The patient was a young lady, æt. 19, whom I was asked to see in consultation. She had been ill for six weeks, having caught cold after bathing, and had suffered from frequent and very distressing cough, pain in the chest, great restlessness and delirium. She was much exhausted by almost constant cough and profuse perspirations. The results of the physical examination pointed to the presence of a large effusion into the left pleural cavity, and on paracentesis being performed sixty ounces of inodorous pus were withdrawn. The relief to the urgent symptoms, cough and dyspnœa, was immediate. In the course of the next three weeks paracentesis was performed three times, the amount of fluid removed on each occasion being, on the first, twenty-seven ounces, on the second, nineteen ounces, and on the third only eight ounces. On the last two occasions the fluid was largely tinged with blood. The patient's condition gradually improved after the first operation and in less than a month convalescence was fairly established. The result in this case was so gratifying that I determined to give a further trial to the treatment in a similar case, should such a one arise, before resorting to the older plans of inserting a stop-cock and tap or a drainage tube, and I have now to record the result. Although it is not so satisfactory as in the former case, it may be of use to give the particulars of the case with a view to comparison and for guidance in the future. The case is as follows:—

Mrs. M—, æt. 25, was admitted to the Cumberland Infirmary April 15th, 1875. She states that she has always enjoyed good health and never suffered from any serious illness until the present. Is now suckling a child nine months old. The present illness commenced on April 6th with shivering, after exposure to cold, followed by cough, difficulty of breathing, free expectoration, and pain in left side, aggravated by cough. On the second day of her illness crepitation could be heard at the left apex, and very shortly afterwards dulness at the base with diminished respiratory sounds. The left side of the chest was blistered, but the pain still continued, and for the last two or three days had been worse.

On admission a careful physical examination showed that there was considerable effusion into the left pleural cavity; the intercostal spaces were obliterated; there was absolute dulness as high as third rib in front, and, posteriorly, as high as spine of scapula. Over the apex in front there was Skodaic resonance. There was no difference in the measurement of the two sides. The apex beat was in the fourth right intercostal space near the sternum. On auscultation posteriorly at the apex there was bronchial breathing and bronchophony, but an absence of breath sounds at the base. At the right apex, posteriorly, some loose crepitant râles were heard, and puerile breathing at the base. It is also evident that the action of the intercostal muscles on the right side was excessive, while no apparent action was visible on the opposite side. The pulse 108, feeble, and irregular in action. Dyspnœa considerable. The physical examination pointing to the presence of considerable effusion into the left pleural cavity, and the distress of breathing being urgent, the respirations being 44 per minute, it was deemed desirable to resort to paracentesis, and by means of the aspirator forty-eight ounces of slightly opalescent fluid were drawn off. The fluid had sp. gr. of 1020, became almost solid on boiling, and contained a number of pus-cells when examined under the microscope. The patient was much fatigued and flushed after the operation, but the apex beat is noted as being nearly in its normal position. It is interesting to note here the comparatively early period of the attack on which the fluid was commencing to be purulent, being only the tenth day of the disease. A morphia mixture was ordered for the relief of cough, and a liberal diet of beef-tea, milk, and wine, to support the strength. With a view to prevent further effusion I acted upon a hint given by my friend, Dr. Maclaren, and had the left side of the chest strapped with adhesive plaster, but in spite of these measures the fluid reaccumulated, and on the 24th paracentesis was again performed, 71 ounces of perfectly inodorous pus being drawn off.

On the 27th it was noted that the apex beat of the heart is felt about half an inch to the left of the ensiform cartilage, that there is good resonance in the infra-clavicular region, but that it is slightly impaired in the mammary region, and that posteriorly the resonance is good as low as the inferior angle of the scapula, and that at the base there is marked dulness. The measurements show the left chest to be 14 inches and the right chest 15½.

During the month of May the patient's condition did not improve; paracentesis was performed three times, on the 2nd, 13th, and 26th. On the first occasion 32 ounces of pus were withdrawn, and on the 13th only 10½ ounces, when some air accidentally entered the pleural cavity owing to the aspirator getting out of order, and as another instrument was not available the operation had to be suspended. For a few days before the 26th the fluid seemed to accumulate rather quickly, and on this day 63½ ounces of pus, still perfectly inodorous, were withdrawn. No traces of bacteria were seen when the pus was examined under the microscope, showing that no harm had resulted from the admission of air at the previous operation. Towards the end of the operation some air was withdrawn from the chest, and it is possible that it was some of the air admitted accidentally at the previous operation, as in the interval the physical signs had been distinctly those of pyo-pneumo-thorax.

On the 1st of June the physical signs were as follows:

The apex beat was in the third right intercostal space. Tympanitic resonance anteriorly on left side as low as the fourth rib, and posteriorly over supra- and infra-spinous regions and interscapular region; increased vocal resonance and feeble respiratory sounds in infra-clavicular region; absence of vocal resonance and respiratory sounds in mammary region and also at base posteriorly. On this occasion the Hippocratic succussion sound was also distinctly heard.

On the 8th of June a small round fluctuating tumour was seen to have appeared about two inches below the angle of left scapula; the line of absolute dulness posteriorly was an inch below the angle of scapula. It was believed that the tumour above mentioned was an effort on the part of Nature to make a natural outlet for the empyema, and it was determined to expedite matters by opening the tumour, and making a counter-opening in the intercostal space above, and then to introduce a drainage tube. Preparations were made for this purpose, and, chloroform being administered, the tumour was opened. Only a small quantity of pus escaped from it, and the most careful examination failed to indicate any connection between its cavity and that of the pleura. As the patient's strength still held good we resolved to give a further trial to paracentesis alone before resorting to the use of the drainage tube. The aspirator was therefore brought and 27½ ounces of pus drawn off by it. At the end of the operation the pus was tinged by blood of a deep red colour. For some days there was only very slight discharge from the abscess, and the physical signs somewhat improved.

On the 16th the dulness over left chest is nowhere absolute, and there is moist friction and tubular breathing heard in infra-clavicular region.

On the 24th there was very profuse discharge from the abscess, so excessive as to wet through the bandages and draw-sheet during the night, and there could be no question but that this discharge came from thepleural cavity.

During the next fortnight the patient's general condition became worse, and there were indications of failing strength. The amount of purulent discharge from the chest varied, being on some days very excessive, and then very scanty for two or three days, the chest symptoms varying according to the amount of fluid present in the pleural cavity. The sputa continued purulent. As the pus did not seem to have a free exit it was determined to make a counter opening and introduce a drainage tube. This was done on the 14th of July, the patient being placed under the influence of chloroform. The original opening being in the eighth intercostal space was enlarged, and the counter opening was made in the seventh interspace about three inches nearer spine. A drainage tube was then introduced by means of a gunshot probe. During the operation about three pints of healthy pus escaped, and after this the patient seemed to be in a very collapsed state, but by means of beef tea and brandy was restored in about half an hour. The discharge continued to come away pretty freely, but on the 20th it was noted as being fœtid in character, and a weak solution of carbolic acid, 1 to 40, was ordered to be syringed through the drainage-tube twice a day. From this date the patient rapidly improved and was soon able to sit up. The cough became less severe, the expectoration smaller in quantity, and the evidence of lung expansion marked. The patient also began to feel stronger and to gain flesh.

On the 13th of August she is stated to have no cough or expectoration, and respiratory sounds are heard all over left chest in front and a friction sound in supramammary region. The circumference of chest, left 14⅛ and right 15⅛.

On the 20th she was weighed and found to weigh 7st. 5lb. From this date her condition was one of gradual convalescence; the discharge becoming smaller and smaller in quantity.

On the 28th drainage tube shortened and posterior opening allowed to heal.

On September 21st apex beat is noted as being one inch and a half to left of sternum.

On October 16th, weight 8st. 6lb., and on October 18th, the date of last examination, the apex beat is noted as being almost in its normal position. Right chest measures 15¾, left 14¼. There is slightly diminished expansion on left chest, particularly in lateral region. Both wounds are now healed and drainage tube has been removed for more than a week. Fairly good resonance all over left chest, but respiratory sounds feeble. No moist sounds heard. She was discharged cured on the 19th of October, having been under treatment in hospital 187 days.

There are a few points arising from a consideration of the above case which are I think worthy of attention. According to most modern writers acute empyema is a rare disease in adult life, but is more common in children. It is also usual to find it as a sequel of scarlet fever or pyæmic poisoning, and especially in the septicæmia, sometimes occurring in women shortly after parturition. The only unusual function that was being carried out by this patient was lactation, and there was no history of exposure to any infection.

I remarked in the earlier part of the paper on the early period at which the acute pleurisy had developed into empyema. It may be asked, have we any symptoms to guide us as to whether an effusion into a pleural cavity is serous or purulent in character? I know of no certain or reliable symptom. The physical signs are the same in both cases, and as you will have noticed they were very well marked in the case now under consideration. It is stated by Niemeyer and others that the long duration of the disease may lead us to suspect the effusion to be purulent. In such a case the increasing emaciation, gradual prostration of vital power, and marked symptoms of hectic would help one to a correct diagnosis, but in the present case these symptoms were not present until a later stage. When it is considered important to ascertain the character of the fluid, the use of an exploring needle or Wood's hypodermic syringe, which acts very well as an exploring needle, would settle the difficulty. As I have already given the physical signs in some detail I will not now refer to them, but I desire to make reference to the temperature chart, which gives the morning and evening range and forms an exceedingly interesting clinical study. During the earlier period of the attack the range of temperature was not great, the morning being 99° or 100° F. and the evening usually 101° to 103° F., but during the latter portion of May and early part of June the range became very high—like that of hectic, the morning temperature being 98·4° to 99° F., and the evening ranging from 103° to 104·8° F. During this period the patient's strength rapidly failed, and emaciation set in. It is of interest to note that when a free exit to the empyema was made, a normal range of temperature succeeded in two days.

In regard to treatment I confess to some disappointment that the repeated evacuations of fluid by means of paracentesis did not lead to a speedy cure, as in the case quoted at the beginning of this paper. It is possible that the greater age of the patient and the fact that she was somewhat debilitated by lactation when the disease attacked her might have something to do in determining a different result. It seemed as if the pus was reproduced too quickly, and although the small tumour at the back was believed to be a simple abscess when it was first opened, I think there can be no doubt but that it had some connection with the empyema, probably a valvular one, and when it became evident by the large discharge of pus that this was so, the only course open was either to put in a canula and stop-cock or to insert the drainage tube. The latter is in my opinion the better and speedier one. In the cases in which I have seen the former plan used and in the records of cases so treated which I have read it is not unusual for a patient to go on for months or even years, during which period one of his chief daily duties is to empty from his chest the accumulated secretion of pus. The use of Chaissagnac's drainage tube greately expedites the cure, and so far as I have seen is not attended with any risk. It is useful to syringe through the tube a weak solution of carbolic acid. In a future similar case I should be disposed to resort to the use of the drainage tube at an earlier period before the patient's strength became so much reduced. The high degree of hectic set up would be an indication for its employment after the failure of paracentesis by the aspirator. The general treatment should be directed to keep up the patient's strength and sustain the vital powers.

ON THE VALUE OF ELECTRICITY AS A THERAPEUTIC AGENT FOR THE RELIEF OF PAIN.

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THE limit to which I must necessarily restrict any account of the observations I have made as to the value of electricity in various diseases renders it imperative that I should confine my remarks to but one of its uses; for, to say nothing of the valuable means of diagnosis afforded by electricity, the diseases for the cure or relief of which some form of electricity has been found to be the most powerful therapeutic agent we possess, are so many and so different that any attempt to give a general account of the therapeutic applicability of electricity within the limits which I am forced to impose on myself would be altogether fruitless.

In order, then, that these remarks may have some clinical value and definitely illustrate at least one of the uses of electricity, I have chosen to speak of those cases only in which *pain* constitutes the chief subjective symptom, and in which electricity has been found to afford almost certain relief, when other remedies had failed or proved only palliative.

I am convinced that comparatively few physicians give electricity that credit which is its due, and thus this most useful agent, especially in respect to the relief of pain, is too generally allowed to remain neglected.

The following cases fairly represent what can practically be done with electricity for the relief of pain; they are chosen from a considerable number, but any of the others would equally well answer the object I have in view; and this will be accomplished if any one who has not already tested the value of electricity will be induced by looking over these notes to give it an impartial trial.

Stöhrer's continuous current battery with thirty cells is the one I use, and I have not yet met a case in which a greater number of cells was required: it may be well to add that the sponges supplied with the machine are far too small. I use whole Turkey sponges, from two to three inches in diameter, firmly tied over the ends of the ordinary electrodes; by this means, the sponges being well soaked in water, or salt and water, the burning sensation so much complained of, especially when the application is made to the rectum, is greatly reduced. In every case it is better to begin the application from a few cells only, and gradually increase the strength of the stream to the point required, as the greatest difference in the effects produced will be noticed in different individuals. In cases too where the sponges have to be applied to the head or spine the patient should constantly be asked if there is any dizziness, and if this supervenes the application should immediately be discontinued.

FACIAL NEURALGIA.

Two forms of facial neuralgia are described by Dr. Althaus;* "a mild one and a severe one, the former comes on after exposure to damp and cold, or after mental emotions, or is owing to caries of a tooth; it is not made worse by moving the face, and it occurs at all periods of life; while the latter occurs generally without any apparent cause, is almost entirely confined to advanced age, and is brought on or made worse by the least movement of the face." I shall illustrate the effects of galvanism in two cases of the first form of the disease, and in one of the second form, or Fothergill's disease; in which operative treatment frequently, and medicinal treatment invariably proves useless. In this instance (Case 3) the beneficial effect of galvanism was most striking.

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* 'Treatise on Medical Electricity,' p. 551.

CASE 1.—*Tic-douloureux of two years' standing relieved by one application of galvanism.*

Miss N—, æt. 24, came under my care in June last, suffering from neuralgia of the left side of the face and which, without cessation for three days previously, had caused intense pain; during that time she had not taken solid food, had not slept, and now appeared to be fairly worn out with pain and want of food and sleep; otherwise her general health was excellent and the teeth were perfect. Two years ago the neuralgia had come on after a debilitating and protracted illness, and since then had tormented her with variable intermissions, seldom, however, leaving her for long. She had got so tired of trying different remedies that, to use her own words, she "believed the only thing to do was to let it wear itself out." At the present moment her face was blistered from some liniment she had been using; it is difficult to describe the agony she was apparently enduring, walking about the room imploring me to do something to ease the pain. Using six cells of the continuous-current battery, I applied the moistened sponge of the negative pole in front of the ear and on the temple, and the second sponge interruptedly over the infra-orbital region and on the cheek. I had scarcely applied the sponges when she seized the handles of the reaphores and tightly pressed the sponges to her face, declaring that the pain was going. I continued the application for five minutes, when she said the pain had gone. The day after this lady came to me stating that she had slept well and enjoyed her food and had had no return of the pain, but asked for another application in case she should. I have just now heard from her that, since that time, now six months ago, she had been perfectly free from pain.

CASE 2.—*Neuralgia of the face due to pregnancy cured by three applications of continuous current.*

Mrs. B—, æt. 37, five months advanced in her first pregnancy, complained of great and unremitting pain in the left side of the upper jaw; two teeth had been extracted, different applications used, quinine and various medicines taken, but all with the same result, the pain continued. I applied one sponge, the negative pole, over the infra-orbital foramen, the positive sponge inside the mouth, over the painful teeth, gums, and antrum, retaining the negative sponge in position and slowly moving the positive sponge over the painful parts. I used the current from six cells, and continued the application for five minutes. The lady left my house completely relieved, but returned next day, the pain having recurred. I repeated the galvanism twice, and during the remaining three weeks of her stay in Blackpool there was no return of the pain.

The beneficial effect of galvanism in this case was especially interesting, as the neuralgia was no doubt due to the existence of pregnancy, and these cases are noted for the persistent character of the pain even when the painful teeth have been extracted.

CASE 3.—*Fothergill's disease; pain relieved after three applications of galvanism.*

I was asked to visit Mrs. ——, an old lady of nearly 80 years, whom I found in bed in a most prostrate and exhausted condition. For years past she had suffered intense paroxysms of pain in the right brow, temple, and down the right side of the nose; but she described the present attack as the worst she had ever endured. The eye could scarcely be seen owing to the puffed and swollen state of the forehead, eyelid, and nose; this she described as erysipelas, with which, she said, the painful attacks invariably terminated; in fact, she looked upon the erysipelas and the pain as cause and effect, the latter only abating when the former "came out." I tried to assure her that there was no erysipelas, that the tender and swollen condition of the face was owing to neuralgia, and that I believed nothing would give her permanent relief except the application of electricity; but in this I failed, and was forced to content myself with prescribing pills containing quinine, belladonna, and cannabis indica. As might be expected, without effect, the pain continued. At last, after much persuasion, she was induced to let me try the electricity. I began with only two cells of the continuous battery, and used very gentle pressure, because I was not certain that I had not to deal with a case of neuritis of the trifacial nerve, but the application of galvanism quickly set the question at rest; for independently of there being no anæsthesia or muscular palsy, the patient herself requested that I should "press harder" and increase the power of the current. Dr. Althaus lays stress on this fact as a reliable means of diagnosis between neuritis and the severe form of neuralgia; in the former disease patients dislike the application of the continuous current, in the latter they relish it. Increasing the strength from four to six cells, I applied the sponges irrespective of the poles, at short intervals all over the painful parts and continued the application for five minutes. Considerable relief was afforded by the first application.

On the day following the swelling was scarcely visible, though the surface of the face was still very sensitive; after the third application the pain had gone. For some weeks after, at the old lady's request, I applied the galvanism every third or fourth day, using two or four cells; her health greatly improved, her appetite returned, she was able to take long walks, and left Blackpool at the end of two months perfectly well.

CASE 4.—*Neuralgic pain, referred to the heart, cured by continuous current.*

Mrs. ——, æt. 40, consulted me for pain in the region of the heart, which caused her great anxiety; it was always worse at night when she lay down; she was unable to lie on the left side. With the exception of slight weakness of the heart's action there was nothing to account for the distressing pain. After trying, without effect, belladonna plasters and medicinal treatment, I applied the continuous current, using four cells of Stohrer's battery, and after a few applications the pain was completely removed. I saw my patient quite recently, and she says she has had no return of the pain since.

UTERINE PAIN.

CASE 5.—*Neuralgia of uterus cured by Faradisation.*

In July, 1874, I was called to see Miss ——, æt. 44. She had for a long time suffered great pain in the womb, which was intensified when the catamenial periods were coming on; at the time I speak of she was evidently enduring great pain, which had lasted a considerable time. I suspected misplacement, but on examination found the size and position of the womb perfectly normal. I faradised the womb with marked benefit, and on visiting my patient next day found that the menstrual discharge had appeared soon after I had left the house. Subsequently I continued the applications until near the next period, which came on without pain, and since then has not recurred.

SCIATICA.

I have treated so many cases of sciatica with the continuous current, and so invariably with the same result, that it is quite at random that I choose the two following cases; the effect of the current when thirty cells are used is almost certain; the pain ceases and temporary numbness of the limb is produced. I believe that when applied in the manner described in Case 6 the conductibility of the nerve is partially arrested.

CASE 6.—Mr. J—, æt. 45, sent for me five months ago in consequence of a severe attack of sciatica in the right thigh. I found him sitting on a chair with the painful leg stretched out, pressure or movement causing unbearable pain. With difficulty he hobbled to my house and when he got into my room described the pain as "something awful." There was a distinctly painful point near the middle of the thigh. Using the full force of the battery, thirty cells, I applied the negative sponge outside the tuberosity of the ischium over the sciatic nerve where it emerges below the pyriformis muscle, and the positive sponge to the popliteal space; thus including the painful part between the sponges. He declared he could not bear the pain of this, but I persisted for nearly five minutes with the application, my patient roaring with pain the greater part of the time; when I removed the sponges he was astonished at finding the pain had gone, he pressed on the part that had been so painful and kicked out his leg to make sure that there was no mistake about it, and finally walked home without a limp. There was slight numbness in the leg next day; but since then there has been no return of the pain.

CASE 7.—Mrs. F—, æt. 42, mother of a large family, has been for years a martyr to sciatica; in May last she consulted me about it, though she said she could scarcely hope for relief. I applied the continuous current to the same parts and with the same force as in the case last mentioned, and with the same result. In a few days, however, she came again, as the pain had recurred, and again she got immediate relief. Two days after this second application I gave her a third, and since then she has been quite free from pain.

HEADACHES.

No one who has not tested for himself the value of electricity in various kinds of headaches can form even a proximate estimate of the relief that it constantly affords. Its beneficial effects are most apparent in those aggravated and persistent attacks of headache which have resisted all ordinary treatment. Hemicrania or sick headache is specially amenable to the continuous current; a few gentle applications, and in some instances one application, from two to four cells of Stöhrer's continuous current battery, the sponges being applied to the temples or mastoid processes, for two or three minutes, will effectually give relief. I refer as an illustration of the effect of electricity in relieving headaches to the following case, not only on account of the severity of the headache, but because in it marked relief was afforded to intense pain in the eyes and intolerance of light (photophobia) symptoms of the glaucomatous affection that existed in then. Photophobia is relieved by the continuous current, not only when it results, as in this case, from glaucomatous disease, but also from its more constant cause, ulceration of the cornea.

CASE 8.—*Intense headache, pain in the eyes and photophobia relieved by the continuous current.*

A married lady sent for me in consequence of the pain she was suffering in the head and back of the eyes; the pain she described as terrible, and "as if something was being bored through the temples." She said her eyes felt as if they would "crack," and she could not bear the light. This lady, three weeks previously, had consulted me about her eyes, and the rapidly increasing loss of sight which she latterly noticed had been coming on. Ophthalmoscopic examination then revealed far-advanced glaucomatous excavation of the optic disc of one eye; the dilated retinal veins characteristically curving over the cupped edges of the disc. Atrophic changes were apparent in the other eye. With a view to ascertaining the advisability of submitting to iridectomy, I advised this lady to consult an eminent oculist. Weeks, however, elapsed, and when I now saw her she was prostrate with pain. Finding the morning after my visit that no relief had been obtained by the remedies I had prescribed, I applied the continuous current, using four cells, the sponges being applied to the temples and also to the mastoid processes, and the application lasting four minutes. At the expiration of half an hour after this application my patient said that the pain in the head was quite gone at the right side, and much less at the left, but the pain in the back of the eyes was still severe. I then applied the moistened sponges to the closed lids of either eye and the corresponding temple, the application for each side lasting two minutes. She was greatly relieved by this, and in the evening told me that the pain was very slight, more like stiffness than pain, but that the tight feeling in the eyes continued. That night she took Pot. Bromid. 10 grs., chloral 15 grs.

The next day I found the right side of the head and right eye were perfectly free from pain, but there was a heavy painful feeling in the left. Most complete relief was then afforded by another application, and the photophobia disappeared. The pain having in a degree recurred during the night, I applied the galvanism again next day, affording immediate relief.

RHEUMATISM.

In the treatment of local rheumatism no remedy has more decided and permanent effect in relieving pain than the judicious application of electricity. The relief afforded by the subcutaneous injection of morphia is too often only temporary, while ordinary medicinal treatment most frequently altogether fails. In using electricity for muscular rheumatism, I have found that a combination of galvanism and Faradisation is the most certain mode of securing relief from the pain. In many cases I found that the induced current alone did not ease the pain; but if applied after a longer or shorter course of galvanism, its beneficial effects were at once apparent; while in many cases galvanism failed to give relief till the induced current had been subsequently applied.

CASE 9.—*Rheumatism in the neck; pain and stiffness cured by galvanism and Faradisation.*

Mr. B—, æt. 48, after a day's exposure to wet and cold, was seized with a stiff and painful neck; for a fortnight he tried various remedies, but the stiffness and pain increasing he came under my care in October. After the first application of the continuous current from four cells, the sponges being applied to the occiput and neck, the pain was greatly relieved and the stiffness somewhat lessened; similar applications were made on the two following days with complete relief from the pain, and after a few subsequent applications of both galvanism and the induced current the stiffness left.

CASE 10.—*Chronic rheumatism in the finger joints cured by Faradisation.*

Mrs. ——, æt. 37, consulted me in February last for painful swelling of the metacarpo-phalangeal joints and all the joints of the fingers; the middle joints of the fingers were especially painful, swollen, and stiff, and the skin covering them was a dusky blue; the fingers were flexed. They had been bad for years, but latterly had got much worse. I advised electricity, and showing her how to apply the induced current through the joints, gave her a Stöhrer's battery to use at home. After three weeks I saw her; the pain had quite gone, the swelling was scarcely visible, the natural colour was restored, and she was able to extend the fingers perfectly. I saw this lady recently, and she tells me she has had no discomfort in the fingers since then.

LUMBAGO.

CASE 11.—*Lumbago of long duration cured by continuous current and Faradisation.*

Mr. ——, æt. 65, a gentleman of very active habits, consulted me in May last for a very severe attack of lumbago, which had lasted for many weeks and resisted treatment. When seated, it was with difficulty that he could raise himself up, and to avoid the pain caused by movement he lay on a couch without stirring for hours during the day. There was an abundant deposit of urates in the urine, and he had frequently passed a number of small uric-acid calculi; he was also troubled with acid dyspepsia. I prescribed lithia water, pepsine, a mixture containing small doses of Pot. Iod. and aconite, and recommended electricity. I applied the moistened sponges all over the lumbar muscles, using from ten to fourteen cells of the continuous battery, and continued the treatment for seven days, each application lasting five minutes. The pain, although relieved, continued to cause great discomfort; I then Faradised the muscles, using Stöhrer's induced battery; after the third application the pain had quite gone, and on returning home this gentleman resumed his ordinary active occupation.

MYALGIA.

It is important to distinguish between myalgia and muscular rheumatism; Dr. Inman, of Liverpool, has drawn attention to the subject, and has described a train of symptoms sufficiently distinctive and well marked in the following case.

CASE 12.—*Myalgia of month's duration cured by six applications of continuous current.*

Mrs. B—, æt. 52, came under my care in May last; she had been for some months attended by a homœopathic druggist for bronchitis (?); when I saw her she was reduced to such an enfeebled state that she could not walk without support on either side; the body appeared exsanguinated; she was reduced to a skeleton, and general debility was extreme; decided asthma was present, and well-marked emphysema of both lungs. For weeks past she had not slept; unable to lie down, owing to the difficulty of breathing, she spent the night in trying to move about her room, as she fancied that by doing so she got some relief from the burning pain which tormented her in the back of the neck whenever she attempted to sit still. In the arms and legs she constantly suffered from severe cramps. She had been taking antimony, and had been kept on low diet. Quinine, iron tonics, good nutriment, wine, and rest procured, with chloral and bromide, did much to restore her strength, but the pain in the neck resisted all the liniments I could think of—chloroform, belladonna, aconite, &c.; this always returned with renewed force when she had been up for a few hours. As soon as she had gained sufficient strength to come to my house I applied the continuous current, from first four and finally eight cells; I applied it altogether six times. The pain always left immediately after each application, though at first it returned towards night; but after the fifth and final application it did not recur. I have just heard from the friends of this lady that since that time her health has steadily improved, and that there has been no return of the pain in the neck; moreover, and this is a significant fact, there has been considerable relief to the breathing, and she has not since then had an asthmatic attack.

DISEASES OF THE DIGESTIVE ORGANS.

Of all painful diseases, there are none in which the relief afforded by electricity is more constant and striking than in diseases of the digestive system. In obstinate cases of vomiting, constipation, dyspepsia, flatulency, persistent hiccough, gastrodynia, acid eructations, &c., I have found both galvanism and Faradisation of great value, and in many cases after years of suffering had been endured. The following cases are selected from a large number, because in them actual pain was the most prominent symptom and the one for which relief was sought.

PAINFUL DYSPEPSIA.

CASE 13.—*Pain in stomach and bowels, vomiting, flatulency, of seven years' standing, cured by the continuous current.*

Mr. ——, æt. 65, for seven years had been a martyr to pain in the stomach and bowels; the pain was always increased by taking food, and was only relieved by vomiting or the discharge of quantities of gas by the mouth; there was obstinate constipation, which had to be overcome by strong purgatives; the paroxysms of pain were at times so intense, that the man has been "thrown down in an agony," and on one occasion, his employers believing that he was intoxicated, very narrowly escaped rough treatment. He was very temperate, and his diet was very limited; he had learned to avoid those articles which increased his discomfort. Of medicine he had certainly taken his share; his occupation compelling him to change his residence occasionally, he had the benefit of much and varied medical skill; indeed, he said that for seven years he had never been out of the doctor's hands. I prescribed

Friedrichshall water to be taken in the morning, and Vals water with a little brandy to be taken during the day. I at once began by galvanising the bowels, applying the positive pole to the rectum, and passing the other sponge from spot to spot over the whole of the abdominal walls, and using a considerable amount of pressure. I began with twelve, and ended with thirty cells, and each application lasted five minutes. As the sponge was passed along the track of the colon, the motion of the wind was apparent, and the noise distinct; I also galvanised the stomach itself, by pressing the negative pole on the cardiac end, and passing the second sponge with deep pressure towards the pylorus. This treatment I continued for six weeks, two applications each week. After the first application the pain was never severe, and vomiting never occurred; at the end of the third week wind was freely passed by the rectum, and the Friedrichshall was quite sufficient to produce a comfortable daily stool. When I discontinued the galvanism there had been no pain whatever for several days, and a month after he visited me, saying he was a new man, and that his object in coming was to obtain leave to extend his dietary. I saw this patient again to-day, Nov. 29th, and his report is in every way satisfactory; his morning draught of Friedrichshall is his only physic; the pain has never returned.

CASE 14.—*Dyspepsia, pain in stomach and flatulent distension of bowels, relieved by continuous current and Faradisation.*

Mrs. ——, about 45 years of age, mother of several children, had for years been a great sufferer from pain in the stomach and bowels, which was always worse after taking food; there was great flatulency and distension of the stomach, causing at times distressing irregularity of the heart's action. The abdominal parietes were very weak, and the bowels were extremely constipated, owing to the feeble peristaltic actions of the intestines. This lady was so circumstanced that she had had the advantage of the very best medical advice that could be procured, but any relief she got was only temporary, and when she consulted me looked on any cure for her sufferings as hopeless. I suggested electricity, which was readily assented to, but the accompanying gentle medicinal treatment which I prescribed was obstinately resisted. I galvanised the stomach and bowels, applying the sponges in the same manner as in Case 10, and using from eighteen to twenty-six cells. After five applications the relief to the pain was complete and permanent, but subsequently I Faradised the abdominal muscles with marked benefit. I have recently seen this lady, and she says that, remembering how long and wearily she suffered, she looks on the effect of the brief galvanic treatment I had subjected her to as something miraculous.

CASE 15.—*Flatulency and painful dyspepsia relieved by the continuous current.*

Mrs. ——, æt. 59, a corpulent woman, mother of a large family, consulted me on account of pain in the stomach to which she had been subject for years; flatulence was also very painful and distressing, and she constantly vomited quantities of watery fluid. Her diet was restricted to a few articles of the simplest nature, and the quantity of food she took was extremely small, and to this she attributes the great weakness of which she complained; when I first saw her she was able to walk but very short distances. The bowels were constipated, and wind seldom passed by the rectum. She had taken quantities of medicine, charcoal, bismuth, pepsine, &c., but nothing gave her relief. I prescribed Pullna water to be taken in the morning and Vichy during the day, and galvanised the stomach and bowels; she was obliged to leave Blackpool for a time, but returned and I continued the treatment. I applied the continuous current using twenty cells, altogether eight times, and subsequently Faradised the relaxed abdominal muscles several times till their strength was restored. When this lady left for her home she could eat heartily with comfort and relish, take long walks, and had been for some time free from pain.

CASE 16.—*Colic cured by uninterrupted current.*

In May, 1874, I was hurriedly sent for to see Miss ——, æt. 45, of very full habit of body, subject for years to violent spasms in the bowels. I found her bent double on the floor, evidently in great pain. Stimulating enemata, hot fomentations, and a mixture containing ether, ammonia, and hydrocyanic acid, had no effect; finding that nothing gave relief I Faradised the bowels, pressing the moistened sponges so as to include between them small portions of the bowels; soon there was a rumbling noise followed by the discharge of a large body of wind by the mouth and instantaneous relief. About six months after this the same thing occurred, and I then advised Miss —— to continue the application of electricity for some time, which she did, applying it herself. Since that time, now more than a year ago, she has not had any return of her old attacks.

DEFICIENT AND PAINFUL LACTATION.

CASE 17.—*Pain in the breasts relieved by Faradisation, and abundant supply of milk established.*

I saw Mrs. —— five days after the birth of her first child; there were shooting pains in both breasts which prevented sleep, and the supply of milk, which had been scanty from the first, had quite disappeared. The nurse had begun to feed the child from a bottle, and had got a strong girl to draw the breasts, but no milk came. I Faradised both breasts, and before I had discontinued the application milk began to flow from the nipples, and the pain vanished. The next day, the flow of milk not being sufficiently abundant, I Faradised the breasts again with the result of fully establishing a good supply of milk.

CANCER.

I have not, since I learned its value in relieving pain, had a case of cancer in which I could make use of the anæsthetic property of electricity, but I cannot more appropriately conclude this paper than by mentioning a case referred to by Dr. Althaus, in which a patient of Professor Braun's, who had cancer of the breast, and who six weeks before death suffered from pain, spasms, and sleeplessness so severe as to defy all the usual means for the relief of those symptoms. The patient could not rest in bed, but had for three nights and days been without sleep, and contracted with pain. After two applications of the continuous current the patient felt so much relieved that she could assume the horizontal position in bed; the use of the current was continued up to the time of her death, and was the only thing which at all relieved her sufferings.

THE MECHANISM OF THE OUTLET IN NATURAL LABOUR

AND

IMPORTANT PRACTICAL APPLICATIONS WITH REFERENCE TO THE QUESTION OF SUPPORTING THE PERINÆUM AND HOW TO PREVENT ITS LACERATION.

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Since the publication of the original monograph of Naegele obstetricians have for the most part accepted his description of this the concluding part of the mechanism of labour as the correct one. He says—

> " It is not, however, the centre of the occiput that advances under the pubal arch, but the head approaches the *os externum* with the posterior and superior part of the right parietal bone, and remains in this position until it has passed through the outlet of the pelvis with the greatest circumference which it opposes to it, when it turns itself with the face completely towards the right thigh of the mother. When the head is engaged in the external passages, and we trace the sagittal suture with the point of our finger from the posterior fontanelle it will, during examination, take the direction of a line drawn from the left descending ramus of the pubis to the right ascending one of the ischium. According to my observations the head does not complete the revolution upon its perpendicular axis from left to right, or, in other words, the change from its oblique position to that where the face is directed towards the hollow of the sacrum, not even when it passes through the os externum with the greatest circumference which it offers to it, viz. a circumference which is not taken according to its lateral diameter (viz. from one parietal protuberance to the other), but a circumference which intersects the small and great diameters of the head at acute angle. If in a labour that proceeds sufficiently slowly, whether it be a woman pregnant of the first child or one that has already borne several children, we keep our finger in contact with the posterior fontanelle from the time that the head enters the external passages till it is born, we find that it usually remains directed towards

> the left side *until the head has entirely cleared itself.* In this position, where the head continues for some time at the os externum, and where it remains stationary during the interval of one or two pains, with its greatest circumference encircled by the labia, the sagittal suture will not be found directed towards the posterior or lower extremity of the os externum (posterior commissure), but crossing the right labium in an oblique direction from left to right at some distance from the posterior or lower extremity, and the right tuber parietale will be distinctly felt clearing the labia before the left." (*Naegele, Rigby's Transl.*, pp. 23—25.)

With this description of Naegele I am inclined, so far as it goes, with some exceptions, to agree, but he stops short with the saying "*until the head has entirely cleared itself,*" and gives us no idea as to how the process of clearing is carried out. It will be my object to show what the mechanism of this process is. I have consulted many authorities on this point, but none of them have given any attention to it, and this is the more to be noted because a knowledge of the true mechanism of this particular stage of labour is necessary to enable the accoucheur *almost invariably*—I may say to the expert and intelligent, *invariably*—to prevent rupture of the perinæum. But first let me cursorily look at the views of some of our best modern authors on midwifery. One of the most distinguished on the mechanism of labour, Professor Leishman, of Glasgow, says—

> "With reference to the obliquity of the outlet the general result of my conclusions on this point tends to confirm the opinion first enunciated by Naegele and described by him with tolerable accuracy." (*Mechan. Part.*, p. 86.)

And in his recent work on midwifery we find the following as the description of the mechanism of the outlet:

> "From the time at which the head comes under the reflected force of Solayrès, its general direction is altered and now corresponds pretty closely with the axis of the vagina, continuous with the axis of the bony pelvis. The general direction of this is downwards and forwards, so that the head may be assumed now to move in a direction which forms an approach to a right angle with its original course. The pressure of the head upon the perinæum gradually effects the dilatation of the terminal portion of the canal. The left division of the os frontis in the immediate vicinity of the fontanelle, or the contiguous portion of the parietal bone, presses upon the coccyx, which moves backwards to the extent of an inch, in order to permit of the passage of the child. If the pelvis is at all under the average in point of size, the frontal region is arrested at the apex of the sacrum, and the occipital end of the lever is again driven downwards, so as to press upon and distend the perinæum. If, however, the parts be ample and the perinæum not unduly resistant this does not occur, and the whole bulk of the head follows the curve of the sacrum at every pain,

obviously attempting to effect an exit immediately under the pelvic arch. From the above description it is apparent that the occipito-mental or longest diameter of the child's head is never at any time thrown across the pelvis; indeed, if the flexion of the head is great Dr. Hodge is not far from correct when he describes it as coinciding with the axis of the brim. The moment now approaches, however, at which a new movement must be executed, that of extension, and it is difficult at first to see how this can be effected without the extreme diameter being turned into the conjugate of the outlet. Nature, fortunately, does not attempt this movement until the occiput is passing upwards in front of the symphysis pubis in the act of birch."—(*System of Mid.*, p. 823.)

It will be seen that while Dr. Leishman uses the statement "the whole bulk of the head follows the curve of sacrum at every pain, *obviously attempting to effect an exit immediately under the pelvic arch,*" he gives us no explanation whatever of how this is done. I presume he must look upon the process as one only of moulding and not of mechanism.

But to our next author. In his researches into obstetrics Dr. Matthews Duncan, whose views on the so-called obliquity or lateral flexion in the first stage of labour I completely agree with, thus describes the mechanism of the outlet (chap. v, p. 358):

"When the biparietal diameter of the head has reached the lower boundary of the upper half of the pelvis, it is arrested in its direct progress. The vertex impinges on the posterior wall of the pelvis, and in its farther advance the head, as a whole, must change the direction of its course. This change, of course, is too abrupt for the parts of the head to follow perfectly. Moreover, there is no room in the pelvis for such a degree of lateral flexion as this would imply, that is, as would be necessary to maintain the head presenting directly to the plane of the pelvis through which it is now advancing. While advancing at this point of its progress, the presenting part is changed; it soon becomes the upper and posterior part of the parietal bone, instead of, as before, a point in the mesial line of the head. With this point advancing in the axis of the pelvis it is evident that the sagittal suture, or mæsial parts, are far removed from it, and, consequently, that the head is passing through the lower half of the pelvis, and the outlet over the perinæum, and through the vulva more or less obliquely and not directly. *In accordance with this obliquity the child's head is flexed laterally*, or, to be more exact, *flexed obliquely*, that is, bent, not directly over the right shoulder, but in a direction midway between extension and direct lateral flexion. As it approaches the orifice of the vulva, and rotates so as to bring the occiput nearer to the pubis than it was in the earlier part of its progress, this flexion gradually approaches nearer to extension; but it does not become direct extension, almost always maintaining an obliquity, that is, a direction between extension and flexion."

And again, further on, Dr. Duncan states:

"The head is at first in this, the second part of its course, laterally flexed to the right with a backward obliquity, and when passing the vulva this is slightly changed the condition being one of extension and *a lateral obliquity to the right shoulder.*"

This lateral obliquity to the right shoulder as defined by Dr. Duncan is more apparent than real, and depends for its appearance as lateral obliquity upon the position of the right shoulder, fixed against the short anterior bony wall of the maternal passage. While, following the curvature of the fœtus, moulded as it were into the sacral curve, a longer posterior bony wall has had to be traversed by the left shoulder, but in its position, close by the left ramus and tuber ischii, it will be found in equally close apposition to the head as the right shoulder. But in stating this let me point out that this is quite a different thing from the obliquity of the biparietal plane to the plane of the bony outlet. When I come to describe the mechanism of the outlet, I shall again refer to this particular point.

Dr. Dewees thus gives his views:

"When the head arrives at the first part (sacro-ischiatic ligaments of left side) it would remain stationary did not its relations with the pelvis at the lower strait change in such manner as to force the posterior fontanelle to offer itself to the arch of the pubes; in doing this there is a slight twist or pivot-like motion executed at the expense of the neck, which may be estimated at a sixth or eighth of a circle. During this change in the direction of the head it must be recollected that the trunk does not perform a similar movement. In proportion as the head is urged forward the lambdoidal suture is to be more distinctly felt below the symphysis pubis, and if the head be not unusually large, the pelvis a little contracted, or the sacrum too straight, the centre of the occipital bone will be found to correspond with the symphysis pubis; but if either of these circumstances obtain, it will be perceived to answer to the leg of the left pubis and ischium. At this moment the chin of the child, which has hitherto been placed upon its breast, begins to depart from it, the vertex advances and separates the external parts by engaging under the pubis, and rises upwards towards the mons veneris; the inferior angle of the symphysis pubis answers as a kind of axis for the head to turn on; in doing this the head describes about a quarter of a circle backwards, for the head, in issuing from the pelvis, obliges the chin to describe an extension curve passing successively over the whole of the central line of the sacrum, coccyx, and perinæum; while the vertex passes through but a small space. So soon as the head has escaped through the external opening the face is found to turn almost always towards the right thigh."—(*System of Midwifery*, p. 230.)

Caseaux states his views clearly and shortly thus:

"The head being arrested by the floor of the pelvis executes a movement of rotation, during which the occiput passes from left to right behind the symphysis pubis, or rather behind the left ischio-pubic ramus, and the bregma rotates into the concavity of the sacrum, though remaining a little to the right.

"The posterior superior part of the right parietal bone then appears plainly under the pubic arch; the posterior fontanelle is behind the ischio-pubic ramus; and the sagittal suture crosses the coccyx-pubal diameter very obliquely. Being forced on by energetic contractions of the womb, the vertex then depresses the soft parts of the perinæum, and by gradually distending them succeeds in converting the pelvic floor into a part of a canal which prolongs the posterior wall of the pelvis downwards and backwards. It is during this time that the rotation is accomplished; that is, the sagittal suture becomes parallel with the antero-posterior diameter of the inferior strait. The occiput engages in the arch of the pubis, and projects beyond the lower part of the symphysis, until the back part of the neck comes in contact with it, when the anterior progression of the occiput is arrested. Just at the moment when the occiput engages in this manner in the pubic arch, the shoulders and upper part of the body enter the excavation, and in engaging them the fœtal trunk, which is flexible, accommodates itself to the direction of the canal, and consequently heads over a little on its posterior plane; during the moment of extension the following points successively appear in the anterior commissure of the perinæum, viz. the biparietal suture, the bregma or fontanelle, the coronal suture, the nose, mouth, and last of all, the chin. During this process the suboccipito-bregmatic, the suboccipito-frontal, and the suboccipito-mental diameters successively pass the antero-posterior diameter of the inferior strait. As soon as the occipito-bregmatic circumference is beyond the vulva, the anterior border of the perinæum, yielding to its natural elasticity, retracts strongly, slips over the face, and embraces the neck, and just at that moment the head, which was before forcibly turned up in front of the mons veneris, falls back, from its own specific weight, towards the anus. The head remains for a few seconds in this position and then is seen to describe a fifth and last movement, namely, the occiput inclines towards the internal surface of the left thigh, and the face turns towards the right thigh. This process is usually denominated the *restitution*, for the following reasons. Before the researches of M. Gerdy it was generally supposed that when the head executed its movement of rotation within the pelvis the trunk did not participate therein, and that the operation could only take place through the aid of a certain degree of torsion on the neck; and, further, that the head becoming completely disengaged, the neck untwisted, and the head was restored to its natural relations with the trunk. M. Gerdy was the first to demonstrate the faultiness of this explanation, for, in fact, the trunk does participate in the head's rotation in such a way that the shoulders which, in the beginning of labour, corresponded to the oblique diameter, are nearly transverse after this movement, the right, nevertheless, remaining always a little more in front than the left."

Schroeder in his 'Manual of Midwifery,' translated by Dr. Carter, p. 78, says:

"It is this (the resistance of the floor of the pelvis) which presses the small fontanelle forward, and the lower the head descends the more it turns forward, and at the exit of the head the sagittal sutnre is not quite, but approximately, in the antero-posterior diameter of the pelvis. The increased resistance of the posterior wall also presses the whole head forwards, that is, out of the vulva. The expulsive power acting in the direction of the axis of the pelvis, and the resistance which the pelvic floor presents in an opposite direction, do not quite counterbalance each other. It therefore results that the perinæum is slowly distended, and that during this time the upper portion of the pelvic floor pushes the occiput forward from beneath the symphysis. A further progress in that direction becomes impossible as soon as the nape of the neck is pressed against the posterior surface of the symphysis. At this moment a short pause takes place. The expulsive power of the uterus pushes the head still farther down, and protrudes the perinæum until this is so much distended that the upper portion of the outlet can act upon the face from behind and above. By it the chin is removed from the thorax, and by a pressure from behind the head is gradually forced along over the perinæum."

Having now given the gist of the views of some leading obstetric authorities, neither of whom, I am with diffidence compelled to state, reveal the rationale of the peculiar complex movements which go to form the mechanism of the outlet in natural labour. Dewees and Caseaux approach the nearest to it, but fail to give the true explanation. My excuse for bringing the matter before you is its practical application which I have found of value in practice for the last six years, during which I have been at intervals working up the subject by the bedside. What I have got to say is, therefore, not the result of theory or any preconceived ideas, but of practical observations again and again repeated during the process of natural labour. But first let me state that my observations relate to normal conditions of labour, when there is no disproportion between the head and the maternal passages, either from excess of room, or want of it from narrowing, such as too close approximation of the tuberosities of the ischium or other causes.

I shall now consider the situation of the head, in the first position, as it engages the bony outlet of the pelvis; but before doing so refer the reader to the accompanying diagram of the different planes and axes of the pelvis. As the head engages the bony outlet we find the posterior or triangular fontanelle behind and under the left part of the pubic arch and its left descending ramus; and the anterior or quadrangular fontanelle to the right of the coccyx, facing and close to the right tuber and ramus of the ischium, the sagittal suture running in a curved line from the right ascending ramus ischii to the left descending ramus pubis, following the convexity of the head, and passing within half an inch to an inch of the coccyx. The caput succedaneum if the labour is a primipara (and it is desirable to study this mechanism at first in such a case) will be found at this stage well formed over the upper and posterior portion of the right parietal bone. The right tuber parietale can now be traced with the finger and felt midway between the pubic arch and tuberosity of right ischium, behind and covered by the ramus, the upper part of the parietal bone being in such close apposition with the ramus that it has to be pushed back towards the uterus to enable the finger to reach its tuber; the left tuber parietale is under and below or posterior to the left tuberosity of the ischium in apposition to its internal surface. This is the position of the head before a pain comes on, but when uterine contraction takes place, a peculiar complex movement results. The head is forced down, and the right tuber parietale at once impinges against the right ramus at the point above described and cannot be felt by the finger, while the left tuber parietale can be easily felt with the finger in the act

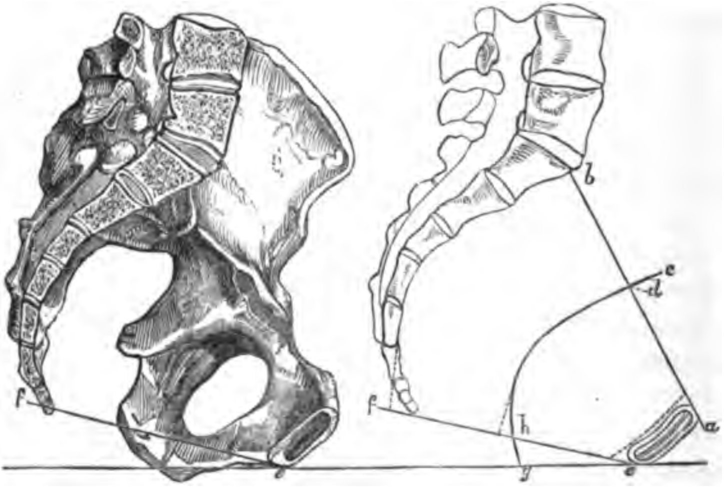

FIG. 1.—Vertical antero-posterior section of a female pelvis, showing left lateral half. *f*, *e*. Plane of bony outlet.

FIG. 2.—Diagramatic sketch of same, showing, *a*, *b*, plane of the brim. *f*, *e*. Plane of the outlet; a line touching the lower edge of the symphysis pubis and point of the coccyx. *c*, *d*. Axis of brim at right angles to its plane. From *d* to dotted line at right angles to *f*, *e*, curved axis of the cavity continued into that of the outlet of the osseous pelvis. (Reduced from Naegele; *vide* Quain's 'Anatomy,' vol. i, p. 99.)

of clearing the left ascending ramus of the ischium, and commencing to distend the soft external parts of the perinæum. But when the right tuber parietale is driven against the right descending ramus pubis, and the left tuber parietale clears the left tuber ischii, there is a movement on the part of the frontal part of the head downwards in the direction of the mesial line and to the left, and that part of the occiput and posterior fontanelle which impinges on the posterior part of the pubis and left pubic descending ramus becomes at once the chief point of resistance, and forms a central area of a movement on the part of the occiput downwards towards the outlet, forwards towards the centre and outer part of the pubic arch, of a spiral progressive character, progressing outwards, rotation taking place from left to right, towards the mesial line of the pubic arch, and so tending to bring the vertex more and more into the axis of the outlet; while at the same time, by repeated advances and retrogressions, accounting for the formation and extension of the caput succedaneum from the right to the adjacent portion of the left parietal bone. In protracted labour this is well seen. Hence at this stage, at the full climax of a pain and during it, the caput succedaneum formed during the latter part of the first stage of labour is found firmly pressed against the right descending ramus pubis; while the sagittal suture and the left parietal bone are brought more towards the axis of the outlet. When the pain passes off the occiput retreats with the same, but a backward spiral movement to the left; and the right parietal bone can be again felt with the finger between the caput succedaneum and the right tuber parietale.

If now as the head again advances in the same manner—for it does so and retreats during the whole of this stage of the labour with the flow and ebb of each pain—the finger be placed upon the anterior fontanelle, it will be found over and in front of the right sacro-ischiatic ligament, near the coccyx and moving towards the anterior surface of it. Under the expelling forces, and the regulating action of the sacral and coccygeal curvatures, the perinæal tumour now begins to form, but extension has not yet begun as nearly all the text-books teach. When the pain has ceased and the head has been again retracted, if the examining finger is again passed, the anterior fontanelle will be found to have moved backwards and to the right, to the right ischium on its inner aspect, and if the finger is kept fixed on the fontanelle until a pain comes on it will be found to be pushed downwards, slightly forwards, and to the left to the front, of the coccyx. This movement must be kept in the recollection, in connection, simultaneously, with the above-mentioned description of the movements of the occiput and vertex along that zone of spiral movement under the left part of the pubis and ramus pubis in its upper part and also in connection with the movements of the right and left tuber parietale. The left tuber parietale having now advanced sufficiently far towards the outlet to clear the plane of the bony outlet, these movements above described of the occiput and sinciput towards the antero-posterior mæsial line of the outlet must necessitate a movement curved in direction backwards and downwards and to the left, of the right tuber parietale from under and from within the inner aspect of the right descending ramus pubis and ascending ramus ischii. Accordingly we find it is so, and this leads to the next stage of advancement, namely, the disengagement of the right tuber parietale from the right boundary of the plane of the bony outlet. I may here mention that the right tuber parietale may be placed under the inner aspect of the ramus ischii at its upper part as I have described it, but I have found it in many instances higher up in the bony plane, under and behind the right pubis and its descending ramus. This disengagement of the right tuber parietale is completed by a downward progressive continuation of the movement first of all of the sinciput to the left and secondly by that peculiar arrangement of compound movements, spiral advancing, and gliding towards the front of the pubis, of the occiput. After the right tuber parietale has escaped from the plane of the bony outlet, it seems to take the lead in advance of the left, but the cause of this is as follows. Before the occiput glides forwards over the pubic arch, and during the pain which completes the labour, if the finger is passed *per rectum,* the anterior fontanelle will be found to the left of the coccyx. The sagittal suture has now continued its rotation movement, over the antero-posterior mesial line of the outlet, anteriorly to the right, and hence the posterior position of the right tuber parietale gives it a seemingly greater prominence. The subject of biparietal obliquity, I will consider farther on. At the moment of expulsion of the chin in cases where the left hand of the child is in apposition with it and to the left of it, I have felt the left shoulder in contact with the inner and lower surface of the left tuber ischii. During the succeeding pain which expels the shoulders, the left turns round towards the coccyx, at the same moment that the right comes under the arch of the pubis. Either may be expelled first, or both may come at once, but although the right has the shortest distance to travel, the left is generally the first to escape, except in primiparous cases. The face has then turned to the right thigh and groin of the mother, and the hips come down in the left oblique, but the left having to travel over an extended curve of the perinæum, continues the rotation of the face over the abdomen of the mother in such a way that in the act of complete expulsion the child is thrown on its right cheek and arm, facing the left thigh of the mother. This is seen in typical cases. It will thus be perceived that from the commencement of a natural labour to its termination the head completes, firstly, a rotation movement of half a circle, and, secondly, reversely, a full circle of spiral movement.

I shall now relate a case by which I hope to illustrate and supplement the description of the mechanism above detailed:

Study by the bedside.—Mrs. P—, aged twenty-eight, pluripara, in good health. Head in position as follows at the commencement of the second stage of labour. Triangular fontanelle to left, under and behind pubis and descending ramus pubis; sagittal suture curves backwards, with its convexity in the axis of the outlet, over the antero-posterior mesial line to the quadrilateral fontanelle, which latter is placed in contact with the right tuber ischii and is pushed against it from within. The right tuber parietale is within and beneath the right descending ramus pubis, and the right ear is felt more immediately under the arch and behind the descending ramus pubis on pushing the finger anteriorly and past the tuber parietale, or posteriorly with reference to the fœtal head. The left tuber parietale occupies a position near the left tuber ischii, opposite, and somewhat posteriorly; in short, relatively to the pelvis and plane of the bony outlet, it occupies the same position to the left tuber ischii that the quadrangular fontanelle does to the right; while the right tuber parietale occupies a somewhat corresponding position to the right pubis and descending ramus, as the triangular fontanelle does to the left pubis and its descending ramus. The caput succedaneum is formed over the upper and posterior portion of the right parietal bone, but is now, during each pain, extending towards the sagittal suture as the latter comes into the direction of the axis of the outlet, and still farther over to the left upper and posterior part of the left parietal bone, for as yet the sagittal suture occupies the right oblique position running in the direction indicated by the above description of the position of the fœtal head. The passage being narrower than usual, moulding now takes place to a certain extent and the triangular fontanelle is forced more and more towards the line of axis of the outlet. This enables the finger to be passed, during the interval of a pain, up towards the right shoulder, the clavicle of which can be felt behind the right part of the symphysis pubis, while the shoulder is behind the pubic arch, and the spine lies towards the left pubis and its descending ramus and ascending ramus ischii. The left ear can be felt between the left tuber ischii and the coccyx, but nearer the latter. At this stage the perinæal tumour has begun to be well formed. Now, during the acme of a pain, the right shoulder can be felt under the arch, in close contact with the right ear, and by a determined effort the left shoulder can also be found in apposition with the left ear, close to the coccyx in the coccygo-ischial space. There is thus, in this case at this stage of the labour, no biparietal obliquity. There is great difficulty in reaching the left shoulder, and it is not the anterior part of it that is felt as in the right, but the posterior part, and it is more the fold of the neck approaching the shoulder that the finger reaches, but close in apposition to it, and the ear extends down to it, but beyond the reach of the finger unless a very forcible effort is made.

There is this peculiarity in the case, that the head lies more transverse than usual, that is, the obliquity of the sagittal suture is more intensified than normal, so that the finger has room to pass under the pubic arch without displacing the head, and as a consequence of the position the head is locked and no turn or spiral movement of the head takes place during a pain, in the manner I have described as being that of the true typical mechanism. As a consequence moulding only goes on, until the uterus begins to get exhausted and the patient equally so, with fruitless labour. This case usually would be terminated by accoucheurs with the aid of forceps.

Manœuvre to rectify the position and so reduce the case to the normal type.—I passed my finger over the left tuber parietale before a pain came on, and when it came I pushed the occiput towards the pubic arch, thus bringing the sagittal suture into its normal direction. The space above mentioned, between the pubic arch and the head, was filled up; a second pain and the movements of normal mechanism began, and the third pain finished the labour. Per rectum, I passed the finger and felt the rectangular fontanelle sweep from the right tuberosity of ischium, over the mesial line and the coccyx, and to the left of it, while the occiput glided forward, and at once escaped from the outlet in one pain.

With Dr. Matthews Duncan's description of partial extension, or backward flexion and lateral flexion, I cannot agree, for repeated examinations show there is no extension whatever, but on the contrary that the chin never leaves contact with the chest until it escapes from the perinæum, while the chest and trunk are moulded into the hollow of the sacrum with a greater or less extent of curvature, corresponding to the curvature of the maternal passages, and driven downwards close to the chin. The convexity of the enforced curvature of the fœtus looks backwards, and this is to be considered in relationship to the position of the fœtus in the pelvis, namely, with the head in the right oblique and the trunk in the left or nearly so, and also in relationship, with reference to this stage of labour, to the plane of the bony outlet. For until the left tuber parietale has escaped from that bony plane there is no biparietal obliquity whatever.

In the mechanism of escapement, as I have already shown, the left tuber is the first to emerge from the plane of the bony outlet, while the right tuber is still situate under the right ascending ramus ischii. Lateral obliquity occurs during and assumes its greatest intensity at the acme of a labour pain, and passes off with the pain as the head recedes; and no sooner has the left tuber parietale escaped from the plane of the bony outlet than rectification of the temporary biparietal right obliquity begins, and is completed when the right tuber parietale advances downwards and backwards in the arc of a circle, behind the right ramus ischii, and escapes from it, and the plane of the bony outlet. This is done by the screw movement already described.

But the head does not clear the arch of the pubis and the soft parts in the way described by systematic writers, for the left tuber parietale is in advance of the right in its movement towards the symphysis pubis, so that the occiput points at the moment of complete delivery of the head, to the right groin of the mother. Thus it will be seen that the screw movement of the mechanism of the outlet, from its commencement to its termination, embraces about a quarter of a circle, the posterior or triangular fontanelle having moved from its position within the left ramus pubis, to the right to a position corresponding externally to the right ramus pubis; while the anterior or quadrangular fontanelle from its greater length of arm leverage from the centre of the rotative spiral movement moves through a larger space from near the right tuber ischii on its internal aspect, to a position nearly corresponding close by the left tuber ischii, but external to its plane.

The situation of the occiput, pointing towards the right groin is better seen, and will be more clearly understood if straight forceps is applied in a typical case, where the head is engaging the plane of the bony outlet, the presentation being in the position in which I have all through this paper considered it, namely, the first. At the stage mentioned the blades of the forceps can be applied and locked in a transverse line almost perpendicular to the antero-posterior diameter of the outlet. In this position, the patient being on her left side, the upper blade of the forceps, considered in relation to the fœtal head, lies in front of the right tuber parietale, along the right parietal bone, towards and over the right temple, while the lower blade lies over the posterior part of the left parietal bone, behind the left ear, and towards the neck. In this position the antero-posterior mesial line of the outlet will not pass through between the locked handles of the forceps, but nearly so in a parallel direction. But at the moment of terminating of the labour, the head having been brought down following the different stages of the mechanism I have described, the line perpendicular to that passing transversely through the blades of the forceps fixed *in sitû* on the fœtal head, will be found pointing to the right groin, while the upper or right blade of the forceps will occupy a position at or near the posterior commissure of the outlet, and its lower or left opposing blade will have moved upwards in apposition to, and it may be in part under the pubic arch; the upper blade just at the moment before delivery may drop off, or can be easily removed, while the under cannot be so easily disengaged. This brings me now to—

The consideration of the practical advantages that a knowledge of the true mechanism of the outlet gives in the prevention of rupture of the perinæum.—Its rationale consists in its enabling the head to pass in a less antero-posterior space than it otherwise possibly could, in the position in which it was described, with relation to the narrow apex of the pubic arch and the breadth and length of the fœtal head, without over distension and laceration. When the head is being extracted with forceps, and the perinæal tumour is well formed, this will be well seen if the operator prevents the spiral or rotation movement; and permits the head (sinciput) to be forced against the perinæum, or does so by extracting power. Perinæal tension becomes so great that rupture becomes inevitable, but whenever the leftward movement of the sinciput is permitted, or is given, tension is reduced. In natural cases when no forceps is used, at the extreme moment of tension by grasping the sinciput with the palm of the hand, thumb, and fingers, and giving the leftward movement necessary, the labour may be at once terminated, and threatened laceration of the perinæum prevented. By grasping the head after the various methods taught and described in books, under the heading of supporting the perinæum, and pushing it towards the pubis, the mechanism is dangerously interfered with, or stopped entirely, and as a consequence, the expelling power being strong enough, the broad diameter of the head is driven downwards and backwards along the A-shaped rami pubis, the occiput recedes from the arch, and the sinciput is driven full on to the whole of the perinæal soft parts, and rupture is the almost invariable result. Fortunately nature is generally more decided in her actions than the accoucheur, hence ruptured perinæum does not happen so often as the latter has worked for. Leishman and many others have objected to supporting the perinæum, founding their objections in most instances upon the unsatisfactory results of the practice, and that nature was and is sufficiently able to terminate labour without such an accident happening, or at least very rarely happening, for it *does* happen when proper help is not at hand; but I am not aware that the correct reasons for objecting to the practice of supporting the perinæum have been previously explained. By the method I have described the natural processes cannot be thwarted, but helped if necessary: and to be able to do so correctly implies on the part of the accoucheur a knowledge of the mechanism of labour and especially of the outlet, and an intellegent appreciation of what position the fœtal head presents; in short, it of necessity implies an intelligent attendance upon labour.

ON SERUM SANGUINIS AS A THERAPEUTIC.

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The blood of animals supplying the meat markets, which has been shown by Professor Way to be so rich in nitrogenous matter that, when dried, it compares favourably with flesh, is in this country but little used for food purposes, and as a nutritive or tonic for the subjects of cachectic disease it is almost unknown. In France the value of blood is better understood; it forms the basis of various soups, and is made up with flour into bread and biscuits, while in the treatment of anæmia and pulmonary phthisis it may fairly claim to vie with the preparations of iron and cod-liver oil. Thus Mr. Simmonds, the author of the recently published work on 'Waste Products and Undeveloped Substances,' writes, "It is said to be a curious sight in Paris to see the number of patients of both sexes, and of all ranks and ages, who flock to the slaughterhouse every morning to drink of the still fuming blood of the oxen slaughtered for the table;" and many French writers, including M. Boussingault, whose researches on the character of the iron in the blood and muscles of animals have furnished material for several communications to the Academy of Sciences, have borne testimony to the excellent therapeutical properties of blood. In America also, as appears from contributions on the subject to the medical periodicals, animals' blood is occasionally prescribed for patients suffering from debilitating diseases or sudden prostration, and one case is on record where it was given with singularly beneficial results as a stimulant in a case of typhoid fever.

Still, with all that has been said and written in praise of fresh animal blood as an article of diet and medicine, the notion of gulping down doses of the warm vital fluid at an abattoir is, it must be admitted, sufficiently repulsive to our insular taste to prevent its ever becoming a fashionable remedy in England. Besides, one cannot be blind to the fact that although the albumen, fibrin, and iron in blood recommend it to the notice of the physician, it also contains urea, creatine, and other effete substances, the result of disintegration, which it is not desirable to introduce into the system. For these reasons it appears to me fortunate that the practitioner has in *serum* a medicinal agent possessing many of the nutritive and curative properties of the blood it is a part of, and yet against the use of which few objections, real or sentimental, can fairly be urged.

My attention was attracted to *serum sanguinis*, as a therapeutic, on my learning that it was held in high repute by the journeymen butchers employed at the township slaughterhouses. Among these men I found the *serum* of the blood of sheep and oxen regarded as an almost universal nostrum. It appeared to be commonly used by them as a "cooling" medicine, a laxative and "pick-me-up," was considered a remedy of great value for the treatment of scrofulous children, and as little less than a specific in cases of seat and tape worms.

As the blood from the Birkenhead slaughterhouses, which is contracted for by one firm, is removed directly it is drawn to an outbuilding adjoining, and there the *serum* is separated from the coagulum by means of perforated "straining trays," I have been able to obtain small supplies of fresh *serum* from time to time without the trouble of preparing it. As thus furnished to me it is not so free from corpuscles as to be colourless, and, independent of corpuscles, contains pigment matter hitherto found to be inseparable from it, but though not pure *serum*, it is the fluid which I had heard commended as a therapeutic, and therefore in the condition best suited for testing its reputed virtues. That obtained from oxen resembles in appearance bright red wine, that from sheep is lighter, not quite as clear, and decomposes somewhat sooner. In other respects the preparations are similar. They both contain about 48 per cent. of the albuminous matter of the blood, and are rich in various soluble salts and not deficient in iron.

Being an alkaline solution it might be supposed the *serum* would be very unpalatable, but it is not. Indeed, in taste and smell it might be mistaken for water in which a little beefsteak had been macerated, and when fresh is neither difficult to take nor to retain. Of course, when it is the least tainted, it is as nauseating as unwholesome, but there can be no excuse for giving it in this condition. A fresh supply is always procurable once or twice a week, and that it may be kept sound for a short period I shall be able to show.

My investigations into the curative uses of *serum* were suggested in the summer, and as the liquor is peculiarly unstable during warm weather, I had first to apply myself to the discovery of some agent by means of which it might be prevented from decomposition. M. Brocchieri's process for preserving blood by extracting its solids and combining them with various substances, of which I had been reading, failed to assist me to solve the problem; the addition of common salt simply converted the *serum* into an emetic, and half the chemicals in ordinary use for the prevention or arrest of putrefaction, as solution of carbolic acid, dilute sulphuric or nitric acid, &c., were unsuited, if for no more cogent reason, because they would throw down the albumen. I accordingly made the experiments of which the notes are subjoined.

The *serum* of mixed blood from sheep and oxen which were slaughtered on July 8th was collected on the day following, and on the 10th a sufficient quantity, while yet fresh, was filtered and measured into six ℥ij bottles, ℥j in each. To No. 1 was added Sp. Vini Rect. ♏xv, to No. 2 Liq. Potas. ♏xv, to No. 3 Acid. Sulphurosi ♏xv, to No. 4 Mist. Creasoti ♏xv, to No. 5 Chloraluminis ♏xxx, and to No. 6 a very small piece of camphor. They were then closely corked and left in a cool dark place till July 12th, when each was examined. Bottle marked No. 1 had a sweetish putrid smell, and its contents were covered with a slight pellicle. No. 2, from which some gas escaped on opening, had also a putrid smell, its contents had lost transparency, and were

were covered with a thick ropy scum. No. 3 smelt of sulphuretted hydrogen and slightly of sulphurous acid, and its contents had lost transparency. The *serum* in No. 4 appeared to have begun to decompose; the smell was masked by the creasote, but it had lost transparency. The contents of No. 5 were clear, and seemed sound, smelling faintly of chloralum. The *serum* marked 6 was clear and manifestly sound. The reaction of No. 2 was slightly alkaline, of No. 5 strongly acid, the others were neutral. On July 16th these six bottles, which since the 12th had been corked and in a cool place, were again examined. The contents were in the same condition as when last seen, except that the *serum* marked No. 1 was more decomposed, smelling like sweet urine, and No. 2 had ceased to be alkaline. On the same day (July 16th) a small quantity of *serum* of the blood of oxen slaughtered the day before was, while yet fresh, filtered and measured into three ℥ij bottles, ℥j in each. To bottle marked No. 7 was added Potas. Chlor. gr. xv, to No. 8 Sp. Chloroformi ♏xv, and to No. 9 Liq. Potas. Permang. ♏xv. They were then closely corked and set aside in a cool dark place, where they remained till the 19th, when they were examined. The contents of each were clear and perfectly sound, the reaction neutral. On July 23rd, when they were again examined, the *serum* in bottles 7 and 8 was sound still, that in No. 9 had turned.

The conclusion I arrived at from the experiments was that, even in midsummer, *serum sanguinis* may be easily preserved for a short time (eight days) in four ways, viz. (1) by the weak solution of chloride of aluminium known as chloralum, in the proportion of 1 to 16, (2) by spirit of chloroform, in the proportion of 1 to 32, (3) by chlorate of potash, 15 grains to the fluid ounce, and (4) by a scarcely appreciable quantity of camphor. Of these methods the only one which appears at all uncertain is the first, and this is open to objection for another cause, the mixture of *serum* and chloralum having a disagreeable smell and taste. The practitioner who wishes to make trial of *serum* has therefore the option of at least three drugs by which he may maintain it in an undecomposed state for quite as long a period as is expedient, and he will be guided in his selection according to circumstances.

For my own part I prefer camphor for this purpose, and in the cases which follow, whenever the *serum* has not been given pure the only addition made has been the camphor dissolved from a small floating fragment.

I may here state that during the last week in October I made an attempt to preserve *serum* by the simple process of excluding the air from it. I securely corked two samples, one prepared from ox blood, the other from sheep blood, and placed them aside in a cool place. On the sixth day, when slight clouding of the contents had commenced, the bottles were opened. Both samples seemed still sound, the smell and taste being so nearly normal, had it not been for their scarcely apparent loss of transparency they might have passed for the fresh liquor. From this experiment I infer that in cool weather *serum* may be kept for not less than five days by being carefully bottled.

Some methods of preserving *serum* or "correcting" it when turned, practised by albumen manufacturers, will be referred to at the end of this paper.

I much regret that my ordinary professional duties afford me few opportunities for clinical research, and that the only cases in which the preparation was used I am myself able to record are singularly insignificant. They are briefly as follows:

E. S—, æt. 25, butcher, said to be suffering from tape-worm, took a table-spoonful of *serum*, fasting, and after this single dose voided fifteen full-sized segments of tape-worm. He continued to take the preparation for a few mornings, but not parting with more of the worm, and probably believing himself cured, failed to continue it.

M. S—, æt. 16, a young girl suffering from debility and loss of appetite, was ordered a wine-glassful of *serum*, fasting, for several successive mornings, and found her appetite so improved after the third dose she reported herself as able to "eat greedily a dry crust."

A. G—, æt. 5, a weak, sickly, female child, was ordered a table-spoonful of the *serum* every morning, fasting. After taking it for a fortnight she improved in appearance, and was reported as "now strong and healthy."

These last two cases I could supplement with others somewhat similar, but refrain. The evidence as to whether a debilitated young person is improved or not in a short space of time is almost purely rational, and the fondness of this class of patients for new remedies, and their tendency to attribute any slight improvement in their condition to a change of medicine, render their statements about themselves very unreliable.

I pass on to a couple of cases in which the *serum* was made trial of by Dr. Braidwood, whom I supplied with a few bottles for that purpose. The subjects were patients in attendance at the dispensary department of the Wirral Children's Hospital.

J. W. M—, a male 3½ years old, brought to the hospital on May 27th, was stated to manifest symptoms indicating the presence of entozoa in the intestines. He was ordered to be given two teaspoonfuls of castor oil every night and two table-spoonfuls of *serum* every morning.

On the 31st he was reported to have passed pieces of tape-worm twice, and many thread-worms. Ordered to continue the medicines.

On June 3rd he was reported to have passed a worm on the 2nd, which was produced. It was a piece of *tænia*, which was measured and found to be 6 ft. 10 in. Ordered to continue the medicines.

14th.—No worms passed since the 2nd. To continue the *serum*.

17th.—Worms have again been passed. To continue as before.

21st.—Since last visit worms have come away "in large quantities." They were not produced, but were probably of both kinds, *ascarides* and segments of *tænia*.

B. A—, a female 6½ years old, brought to the hospital on May 31st, apparently suffering from worms in the rectum. Ordered *serum* and castor oil in doses as above.

On June 3rd the mother reported patient's discharges had, since last visit, contained many thread-worms, and that she was still passing them. Ordered to continue the medicines. Here, as in the last case, the mother, probably satisfied with the success of the remedy thus far, neglected to attend.

I now come to the narrative of a more extended trial of the preparation made at the Birkenhead Borough Hospital, as furnished me by Dr. D. C. Davidson, resident surgeon to the institution. This gentleman has for about half a year been, regularly every week, supplied with ℥vi of the *serum sang. bovis* and ℥vi of *serum sang. ovis*, and the report of the results of his experience with illustrative cases is here subjoined. But for the kind interest he has taken in the matter my evidence on the therapeutical uses of *serum* would have been so scanty I must have postponed for the present any notice of this promising remedial agent.

Birkenhead Borough Hospital; Nov. 15th, 1875.

The *serum sang.* has been used in this hospital during the last six months as a vermifuge and also as a substitute for cod-liver oil in the treatment of struma.

As a vermifuge I have found it most successful in cases of thread-worm, less so in *ascaris lumbricoides*, and it failed almost entirely in *tænia*. The only objection to the administration of this remedy is its tendency to produce nausea, unless when obtained in a perfectly fresh state.

The following cases were treated in the out-patients' department of this hospital:

C. H—, æt. 4 years, was brought to hospital by its mother suffering from all the symptoms of thread-worms. I administered *serum sang.*, in ℥ss doses three times daily. On her next visit the mother informed me the child had passed a large quantity of small worms. I directed the *serum* to be continued. A few more worms were passed at intervals and the child's health began rapidly to improve.

S. R—, æt. 2½ years, admitted on August 5th. The child was very restless and irritable. There was apparently great irritation about the anus, and patient was in the habit of picking its nose, &c. I prescribed the *serum*. After the third or fourth dose a number of *ascarides* were expelled with the fæces, after which the symptoms commenced to disappear.

J. N—, æt. 6 years, brought to hospital suffering from pains in the abdomen, want of appetite, diarrhœa, and itching of the nose. He slept little, and was in the habit of grinding his teeth. Prescribed the *serum*, and on the next visit the mother of the boy showed me two large round worms which he had passed.

S. S—, æt. 4 years, suffering from pain in the abdomen and emaciation. There was pruritus of the anus and the child was constantly picking its nose. The mother informed me that it had on one occasion passed a large tape-worm. I ordered the *serum sang.* and continued it for some time without producing the slightest effect. I then prescribed male fern, and after a few doses a large tape-worm was passed.

S. W—, æt. 8 years, suffering from irritation at the verge of the anus, and noticed to be constantly picking its nose, was ordered the *serum*. The administration of a few doses was followed by the expulsion of a large quantity of thread-worms.

M. F—, æt. 5 years, brought to hospital with symptoms of *tænia*. Large doses of *serum* (℥ss to ℥j) produced no effect, but on male fern being prescribed a tape-worm was expelled in a few days.

P. O'B—, æt. 5, was brought to the out-patients' room suffering from pain in abdomen, loss of appetite, pruritus of anus, and great emaciation. The *serum* in ℥ss doses had the effect of bringing away several large round worms.

Many cases similar to the above might be adduced, but those I have written out will show the results of my practice with this simple natural medicine, and make it apparent that the *serum* is a most useful remedy in cases of thread and round worm, and that it is not to be relied on in the treatment of patients suffering from *tænia*.

As a substitute for cod-liver oil I have used the *serum* frequently, and sometimes with the best results. When fresh it is much more easily taken than the oil, and is not so liable to produce sickness.

P. N—, a male child, æt. 12 years, was admitted suffering from enlarged glands, great emaciation, and impaired appetite. Prescribed *serum sang.* in ℥ss doses three times daily. After continuing this treatment for some weeks the patient began to gain flesh and the enlargement of glands gradually diminished. The appetite also returned.

M. A. W—, a female child, æt. 5, was brought to hospital suffering from suppurating glands of neck, great debility, and emaciation. Prescribed the *serum* in ℥ss doses three times a day along with Syr. Fer. Iod. Much improvement followed this course of treatment.

J. S—, æt. 3 years, an anæmic, strumous subject, having a large abscess in the neck. I opened the abscess and prescribed *serum*. The child improved rapidly and is now almost well.

S. R—, æt. 6 years, was brought to the out-patients' department with enlarged glands of neck and scrofulous disease of hip-joint. The patient was in a weak, anæmic condition. I prescribed the *serum sang.* in ℥ss doses three times a day. After continuing this treatment for a fortnight the general health began to improve. S. R— is still under treatment and progressing favorably.—D. Charles Davidson.

The introducer of a new therapeutic agent being apt, however unconsciously, to take a somewhat partial view of the efficacy of the preparation on which he has bestowed time and labour, *serum* is perhaps fortunate in resting its claims to the attention of the profession on perfectly independent testimony. More evidence will I doubt not be forthcoming. On this point I may be permitted the remark that though but two facts are vouched for in the above notes, viz. that *serum* is an anthelmintic and a nutritious food-medicine, it is not in respect of these properties only I would recommend it. The many uses to which an alkaline solution of albumen may be applied are obvious. Thus it will occur to every practitioner how serviceable such a fluid is likely to prove in the treatment of acid dyspepsia, also that it may be employed to suspend oils and resins, and as an antidote in poisoning with corrosive sublimate, salts of copper, &c.

As an anthelmintic I am advised the *serum* should be administered in the morning fasting, the dose being from one to two table-spoonfuls for a child and a large wine-glassful for an adult. The bowels may be prepared for its reception by a simple purgative draught the night before. I am not able to suggest any theory as to how this preparation acts, nor to say whether it is to be considered as a vermicide or merely as a vermifuge. Certainly its effects are specific and in no way owing to its being a cathartic, for this it is not, as I have proved by repeated experiments. On one occasion I administered a ℥vj dose to each of two healthy adults, and in neither did it produce any effect.

As a food-medicine, ℥j of the *serum* should be given two or three times a day, the best time for taking it being probably about an hour before meals.

I am sure none of my readers will need to be cautioned against the danger of using the remedy when not perfectly sound. Fortunately the commencement of decomposition is at once manifest by the smell. Indeed the smell affords a better indication of the wholesomeness or otherwise of *serum* than more delicate tests. M. Feltz, in his recent communication to the *Académie des Sciences* on the toxic effects of putrefied blood, observes that activity on the part of the minute particles in the fluid is not necessary to its septic effect; and it is assuredly true of *serum* that samples in which no trace of life can be detected may be poisonous.

In conclusion, a brief account of the process by which the *serum* obtained from the blood of animals slaughtered at the Birkenhead abattoir is manufactured into albumen, will I hope not be considered out of place. The blood, caught in tin vessels three or four inches deep, is allowed about an hour to congeal and then cut with a knife into pieces two inches by three. The entire contents of these vessels are then thrown into square perforated straining trays of the same metal, three of which one above another are then placed over a plain tray, furnished with a draw-off pipe that slides up and down, so as to allow the top layers of the liquid (the preparation I have been experimenting with) to be drawn off first if required. After the clot has been left to drain for two days it is sent away to be worked up into manure. The *serum* is also removed in casks to the manufacturer's premises, where it is run into large, breast-high settling tanks. In these the *serum* deposits from two to three inches of sediment, and the rest is slowly dried on square flat-bottomed evaporating dishes, in chambers maintained at a temperature somewhat below 130° F. The albumen, thus prepared, in appearance resembles glue. It is used in solution for fixing or "mordanting," as it is called, the beautiful series of dyes obtained from aniline, and also for clarifying jellies, fining wines and cider, and in the preparation of leather.

Mr. W. H. King, the manufacturer who contracts for the blood shed at the Birkenhead abattoir, and to whom I am much indebted for his courtesy and assistance, informs me that a small quantity of turpentine beaten into the *serum* for twenty or thirty minutes will keep it sound for several weeks and that any of the mineral oils effectually preserve it. When the liquor is already turned he "corrects" it by stirring in dilute hydrochloric acid (one part of acid to ten of water) till the desired effect is produced, and then adds a solution of sesquicarbonate of ammonia till normal alkaline reaction is restored.

I have only to add that any practitioner desirous of putting the therapeutical properties of *serum* to the proof will be welcome to whatever help or advice it may be in my power to render.

NOTES OF THREE CASES OF SPINA BIFIDA TREATED BY IODINE INJECTION.

By J. H. EWART,
SURGEON TO ST. MARY'S HOSPITAL, MANCHESTER.

Spina bifida until quite lately has been looked upon as an almost incurable disease, and surgeons have, as a rule, preferred doing nothing to running the risk of causing death by operative interference. Our text-books, too, advocate the same cautions "do-nothing" treatment, and merely name the various plans of treatment that have been employed, only to be followed by various objections to each of them. The profession have therefore much to thank Dr. Morton of Glasgow for, in having revived in a modified form the treatment of spina bifida by iodine injections, and also for the clear manner in which he has stated the results of his operation. As his cases, or rather their treatment, has called forth some criticism, I think the following reports will not be without interest and will add a certain amount of evidence to that already adduced in favour of the method Dr. Morton advocates. The solution used consisted of iodine grs. x, Pot. Iodi. grs. xxx, glycerine ℥j.

Case 1.—The child, one day old, was first brought to St. Mary's Hospital on 29th October, 1874, suffering from spina bifida situated in the lumbar region. Nothing was done at the time, and the child was seen again on the following day, when the tumour was tense and the surface ulcerated. A fine canula was introduced and some pale straw-coloured fluid drawn off, and a pad applied.

November 4th.—Tumour refilled; surface ulcerated. At this time the measurements of the tumour were as follows: long diameter 1⅞ in.; transverse 2 in.; circumference 8¼ in.; the lower border of tumour was 1¼ in. from anus. The tumour was punctured at its lowest part, and about half an ounce of pale fluid, almost white, drawn off. It was intended to inject half a drachm of Dr. Morton's fluid into the sac, but owing to a defect in the syringe and the thickness of the fluid, not more than fifteen minims found its way into the sac. The injection seemed to cause no inconvenience, but I should add that no nerve structures could be demonstrated in the sac.

6th.—Tumour partially refilled, feels harder, especially at and around the point of puncture. Canula again introduced and half an ounce of deep straw-coloured fluid withdrawn. Thirty minims of Morton's fluid were injected into right side of tumour, and no bad result followed.

9th.—Child has been perfectly well since last seen. Tumour decidedly harder and somewhat contracted; half an ounce of brownish-red fluid withdrawn, and thirty minims of Morton's fluid injected; surface of tumour ulcerated. Zinc ointment applied.

11th.—The mother states that the child was convulsed for half a day after last operation.

13th.—Child seems perfectly well. Tumour harder.

27th.—Thirty minims again injected.

December 3rd.—After last injection the child was slightly convulsed; ulcerated surface healed; tumour feels more solid. Injection repeated.

January 6th, 1875.—Lower part of tumour consolidated and shrivelled; upper portion of skin thin and distended; the canula was introduced at this point, and some thick gelatinous fluid escaped. Thirty minims of solution injected.

16th.—Tumour firmer; small portion of skin in centre ulcerated; applied on lint a saturated solution of tannin.

June 10th.—Since last note nothing has been done to the tumour beyond applying the tannin to ulcerated surface; the tumour is quite hard, pressure on it causes no pain; the child's lower limbs seem properly developed, and reflex action is present.

October 23rd.—Child was seen to-day, having been in the country since last report tumour is quite firm, the upper part being somewhat prominent; the child's legs seemed weak, and it has slight talipes varus of both feet; this condition of the feet had hitherto escaped my notice, but the mother states that it has existed since birth.

CASE 2.—A healthy looking female child, one day old, was brought to St. Mary's Hospital on the 16th January, 1875, suffering from spina bifida. The mother is twenty-three years of age, the child her first; she went her full time and had a natural labour lasting seven hours. The tumour is situated in the lumbar region and is soft and fluctuating (instead of tense, as in Case 1), is broader at its upper part than lower (shaped like the heart in a pack of cards, without the notch), and measures transversely 2¼ inches, longitudinally 2 inches. The tumour was tapped on right side and three drachms of highly albuminous fluid withdrawn; half a drachm of Morton's fluid was injected, and with no apparent discomfort to the child.

January 20th.—Skin over the tumour considerably thickened; child has experienced no inconvenience from previous tapping, which was therefore repeated, and two drachms of fluid withdrawn, half a drachm of Morton's fluid being substituted.

27th.—No ill effects from the previous proceedings; tumour decidedly firmer, surface ulcerated; injection repeated, and lint soaked in tannin solution applied.

February 10th and 17th.—The child was seen on both these days, but nothing done beyond paying attention to the superficial ulceration of the tumour.

20th.—The ulceration has healed; base of tumour contracted and puckered; apex fluctuating and skin thin; at this point it was punctured, but no fluid escaped and ten minims of Morton's fluid were injected.

June 3rd.—Since last note the tumour has not been touched; the child was seen to-day, the first time for two months, and found suffering from hydrocephalus. The mother states that her child was quite well till a fortnight ago; the tumour is hard and contracted, and resembles a puckered scrotum.

4th.—The child died. No regular post-mortem could be obtained, but the lower part of the spine was removed for examination.

I regret to say that the gentleman who kindly undertook the examination of the specimen has been prevented by pressure of work from completing his task. I hope, however, at some future time to place the result of the examination on record.

CASE 3.—On June 23rd, 1875, a female child, one day old, was brought to St. Mary's Hospital with spina bifida. The mother states that this is her fifth child, the four preceding ones being perfectly healthy. The tumour occupies the lumbar region, and is flat except at the upper part; skin very thin, the superficial veins large; tumour measures 1¼ inch both ways; reflex action is wanting; tickling the feet produced no movement; tumour had been ruptured, probably in the labour, and fluid was exuding; a canula was introduced on left side of tumour and half a drachm of Morton's fluid injected, without any apparent inconvenience to child; a compress of lint soaked in tannin solution applied.

June 25th.—Child seems perfectly well; moves its legs. Tumour firmer; no oozing; dressing reapplied.

30th.—Child reported as being restless; seems well. Tumour firmer; surface ulcerated; dressed with zinc ointment.

August 10th.—Since last report the child has been seen several times, and dressing of zinc ointment applied; child has been perfectly well; tumour is quite hard and level with the surrounding skin; has very little movement in legs; holds them adducted and crossed as in utero. The child died suddenly the same day at 10 p.m. in convulsions. No post-mortem allowed.

Out of three patients, therefore, two died, and even allowing that the *treatment* caused death, the success of the one case and the almost hopelessness of a spontaneous cure in spina bifida would to my mind justify the operation.

But was the operation, or the effects of the operation, in either case the cause of death? I think one may answer in the negative. Surely the length of time that elapsed between the last operative interference (five months in the one case and six weeks in the other) would put this out of the question; moreover Case 2 died from chronic hydrocephalus, which disease we are told is a frequent complication of spina bifida. In the 'Lancet' of 16th October, 1875, Mr. West, of Birmingham, reports a case of meningocele associated with spina bifida, which he cured by simple tapping, no injection being used; the child died some months afterwards of chronic hydrocephalus, and Mr. West considers that the means employed for the cure had no part in producing the morbid condition which caused death, and in this opinion I think all must concur.

The exact cause of death in Case 3 is uncertain. The child was seen on the day of its death, and showed no appearance of disease; had the treatment contributed to the fatal result, this would I think scarcely have been the case.

So, granting my conclusions to be correct, the three cases now reported really amount to three cases of spina bifida cured by injection of iodine solution. And this brings me to the question of the solution to be used. The ordinary tincture of iodine has hitherto been the fluid generally employed, but the results with this have been far from satisfactory. Is the spirit in the tincture the cause of failure, as it differs materially only in this respect from Dr. Morton's fluid? Holmes in his 'Diseases of Children' relates a complicated plan of injection made use of by Brainard, of Chicago, in seven cases, the solution used being composed of Iodine grs. v, Pot. Sodi grs. xv, Aqua ℥j; and Brainard claims success in all the cases not associated with hydrocephalus, namely, three. The same author tells us that M. Debout cured five cases out of ten with Velpeau's solution (one part of iodine, one part of iodide of potassium, and ten parts of water).

Dr. Morton's solution will be seen to differ from Brainard's and Velpeau's, in the quantity of iodine used and the article employed, and its only drawback is its thickness, causing a difficulty if a small canula be used. This trouble occurred to me in Case 1; but I see that Dr. Morton, in a communication read at Edinburgh before the British Medical Association, especially points out this inconvenience, and advises the use of a medium sized canula.

Then as to the child's state of health, and the age at which the operation may be undertaken. Dr. Morton says, "The child should be in a thriving condition." May I suggest that the time for operation would depend more upon the state of the tumour than upon the state of the child's health? A very tense tumour, or one already ruptured, should surely be treated at once; and I would advocate the same expedition in all cases, seeing how easily the tumour might be ruptured, and the disastrous effects of any great quantity of cerebro-spinal fluid escaping. Indeed, Dr. Morton owes the death of what would probably have been a successful case to this very cause, and I found no bad results from the early treatment of my cases.

Is a tentative puncture necessary? I think not. It may be useful, to prevent the rupturing of a tense sac, and for this reason was resorted to in Case No. 1, as no solution was at hand. The plan I have adopted is to puncture the tumour at its side with a fair size trocar and canula, allow the sac to empty itself to a certain extent, and then with a syringe fitting the canula inject the fluid. This method is simple, and requires only one puncture.

The number of times that the operation is to be repeated is also of some moment, as each additional puncture must to some extent increase the risk to life. Looking over the reported cases, I find only once was it considered necessary to repeat the operation more than twice; once often sufficed.

These facts and the success of my third case with one injection, have forced upon me the conclusion that my six punctures in Case 1 was an excess of zeal, and in future I shall certainly pause a longer time than I have hitherto done before repeating the injection.

These three cases bring the number treated by Dr. Morton's method up to *thirteen*. Out of these *eight* are reported as cured and living, and in good health; *two* cured, but dead from causes not connected with the operation; and *three* died whilst under treatment—a total result most encouraging.

CASES OF HYPERPYREXIA, IN WHICH THE BATH TREATMENT WAS ADOPTED.

BY F. T. PAUL.

It would seem that, just now, when the value of the bath treatment in hyperpyrexia is being so hotly contested in Liverpool, that the 'Liverpool and Manchester Reports' offer a particularly suitable medium for the publication of cases bearing upon the subject.

It must appear strange to those who have carried out this treatment that it should be contested at all; and it would indeed be strange if its efficacy were doubted by any one who had any practical experience of its value. But such is not the case. The sceptics are those fortunate physicians who have not required its aid. Disease has dealt gently with their reputation, and almost flattered them into the belief that their saline and opium is a specific. With simple remedies they have succeeded; and hearing of fatal complications and rigorous treatment in connection, the proper association is reversed, and the offspring is credited with begetting its parent: the treatment being considered to be the cause of the hyperpyrexia.

On the whole it seems nécessary to establish two things. 1st. That the tendency of hyperpyrexia is very strongly to be fatal. 2nd. That previous treatment has nothing whatever to do with its causation. If these be allowed, then any treatment which evades the fatal issue is deserving of the most cordial support. If they be true, the best way to establish them as facts is to publish all the cases of hyperpyrexia so treated; and it is for this reason that I venture to add these to the few more carefully reported cases of Dr. Wilson Fox and others. For though wanting in many details which experience alone supplies, still they are sufficient to bear out the main points at issue, and thus become valuable to the cause they are intended to support.

My share in the cases has come to me as house physician at Guy's Hospital, and as resident medical officer at the Liverpool Royal Infirmary; and having had the entire charge of the bathing in all the cases, the members of the staff under whose care they were have with great liberality placed them at my disposal. For this kindness I am indebted to Dr. Pavy, Dr. Hilton Fagge, Mr. Stocker, and Mr. Reginald Harrison.

The FIRST CASE is one of continual vexation to me, for I doubt that a perusal of its report will convey a truth to the reader's mind, that the most careful nursing, the most careful nourishing, free stimulating, and constant watching are shown by experience to be necessary in a prolonged case. I fear that this truth becomes patent from some laxity in these points, and that one must almost say with the egotistical practitioner, "We lost her!" for one is dealing with a matter of saving or losing life every bit as much as taking a drowning man out of the water; a little delay, and he is drowned, a little neglect and the temperature has reached a fatal height.

But to get on with the case.

It occurred in a young woman, æt. 23, married, and living in London. Her mother and two sisters had had rheumatic fever. She had generally had pretty good health, but had been subject to ulcerated sore throat and pain in the head, particularly at night. Three years ago she had had an attack of rheumatism, which had kept her in bed for a week. There had been a good deal of pain in the affected joints, but not much fever nor sweating. Had been married fifteen months, and had a child three months old.

On November 5th, 1874, she noticed a swelling under the lower jaw on the left side, which gradually extended over that side of the face. It was very painful, but disappeared in a few days after the application of poultices, leaving behind a sore throat, which, however, did not last long.

On the 12th of November she appeared to be getting quite well, when a pain in both knees set in, and again laid her up. In a few days the ankles, hips, shoulders and wrists were all involved, when she was quite unable to move, and was sweating profusely.

Nov. 16th.—She was first seen. Her hair was of a light brown colour, complexion fair, well nourished, and about middle stature. She was lying on her back in bed, sweating. Temp. 101·8°; pulse 128; resp. 32. The rheumatic smell was well marked. Her knees were both swollen and extremely tender; ankles similarly affected in a less degree. Both hips, and the right shoulder and wrist, also involved. Heart sounds normal. Urine, sp. gr. 1030; no albumen; no sugar. Tongue moist, red in the centre, white at the edges. Throat still a little swollen and painful; no ulceration. Chest and thighs covered with sudamina.

17th.—Temp. 102·6°; pulse 120; resp. 34. Urine, sp. gr. 1030; lithates; no albumen. Patient is much the same as yesterday, but has headache. Ordered liquid extract of ergot ʒss in camphor water ℥j every six hours, with milk and farinaceous diet.

18th.—Temp. 104·8°; pulse 118; resp. 40. Patient passed a pretty quiet night, during which she sweated freely. In the morning her skin was dry, and she suffered with a severe headache. The bowels were constipated. The ergot medicine was ordered to be repeated every four hours, and magnesia mixture to be given as required. Through the day the temperature rose, till at 11.20 p.m. it was 106·2°.

19th.—During the night she was delirious, and vomited, though the temperature fell a little, but in the morning it got up again to 106·1°, at which temperature she was bathed. Before the bath her mental condition was doubtful. She answered questions pretty rationally, but did not seem to be at all clear about what she was doing. Her skin was dry, and the pain had left her joints. The urine contained no albumen; sp. gr. 1014. The bath was given at 11 a.m. It was prepared at 90°, and cooled, by adding cold water, to 68° in half an hour, during which time the patient's temperature fell from 106·1° to 98·4°, and her pulse from probably over 130 to 102. Half an hour after the bath the temperature was 97·5°; pulse 84. Two hours after, temp. 99·1°; pulse 90; resp. 32. Upon referring to the list of temperatures it will be seen that there was a degree of difference between the right and left axillæ. This was not owing to any fault in the thermometers. She was quite sensible in the bath, and free from pain and in every way comfortable after it. In the evening the temperature went up again, but she was left comfortably asleep, lying on her side, with the thermometer in the charge of the night nurse. The medicine was stopped.

20th.—Unfortunately, the night nurse proved to be wretchedly incompetent, for the patient was found comatose at 9.30 a.m., with a temperature of 109·8°.* Face livid, skin dry, pulse scarcely to be counted, &c. Indeed, she was thought to be dying; and though as a last hope she was put in a bath, no one expected her to come out alive. The bath was prepared at 90°, and cooled in fifty-four minutes to 50°, during which time the patient's temperature fell from 109·4° to 98·8°. The respiration from 40 to 28; and the pulse, which was 172 before the bath, to 86 in a few minutes after it. Eighteen minutes after the bath the temperature had still further fallen to 95·4°. Shortly after this we were unable to register any temperature in the axilla, it was so low. The urine was drawn on to a thermometer, which registered a little over 92°, and another which was retained in the vagina registered the same. This was about an hour after the bath. The patient was still insensible and very collapsed, so hot bottles were applied, and a brandy and beef-tea enema administered. Shortly she began to rally, and soon after noon she became sensible. The urine which had been drawn off was faintly acid; no albumen; sp. gr. 1012. At noon the rise began, and by 11.45 the temperature had reached 106·6°, when the bath was repeated. It was prepared at 90°, and reduced in forty-five minutes to 74°, during which time the patient's temperature fell from 106·6° to 101·7°, the pulse from 136 to about 108, and the respiration from 36 to 28. An hour after the bath the temperature had fallen to 97·8°. An hour and a half after, temp. 99·4°; pulse 84; resp. 20. She was not insensible when put into this bath, but asked for it.

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* Subsequent correction of this thermometer showed that it was at least half a degree too low at this point.

21st.—Passed a comfortable night. Bathed to-day at 4.30 p.m. Bath prepared at 90°, and reduced in fifty minutes to 70°, during which time the patient's temperature was reduced from 106·7° to 102·4°; pulse from 130 to 92; and respiration from 36 to 26. Half an hour after the bath, temp. 98°; pulse 78; resp. 22. The urea contained in the urine was estimated and found to be normal in quantity.

22nd.—No bath to-day, but the temperature gradually rose. The patient was quite sensible, taking beef tea, milk, and brandy and egg mixture.

23rd.—Bathed at 3.55 a.m. with a temperature of 106°. Unconscious, and with subsultus tendinum. Bath prepared at 90°, and reduced in half an hour to 75°. during which time the patient's temperature fell from 106° to 102°, and pulse from 126 (?) to 106. A quarter of an hour after the bath, temp. 99·7°; resp. 26; pulse about 100. She became quite sensible in the bath. Ordered brandy ℥ss every hour, and ammonia mixture every six hours. In the evening the temperature got up to 106·4°, but since it stopped here no bath was given. A systolic apex bruit was heard.

24th.—Bathed at 1.45 p.m. Bath prepared at 90°, and reduced in thirty-six minutes to 70°, during which time the patient's temperature fell from 106·9° to 100°; pulse from 156 to about 130; respiration from 42 to 26. Ten minutes after the bath, temp. 97·7°; resp. 24. Twenty minutes after, temp. 98·8°; pulse 124; resp. 26. The patient became sensible in the bath.

25th.—Ordered quinine gr. x every three hours. Patient, as usual, became unconscious as the temperature rose. Bathed at 2 p.m. Bath prepared at 90° and reduced in half an hour to 72°, during which time the patient's temperature fell from 106·8° to 102°; pulse from 140 to 116; and respiration from 38 to 30. Twenty minutes after the bath, temp. 99·4°. Sensible. Bruit not audible to-day. Very marked subsultus.

26th.—Bathed at 8.40 a.m. Bath prepared at 90°, and reduced in twenty-five minutes to 74°, during which time the patient's temperature fell from 106·5° to 102·7°; pulse from 142 to about 125; and respiration from about 44 to 34. In ten minutes, temp. 97°; pulse 122; resp. 28. At 12.45 p.m. she had a convulsion lasting three quarters of a minute; temp. 101·3°. She was getting very weak and low, and mucous râles were heard in the chest. Bathed again at 9.20 p.m. Bath prepared at 90°, and reduced in twenty-five minutes to 80°, during which time the patient's temperature fell from 106·7° to 100·5°, and pulse from 150 to 140. Ten minutes after the bath, temp. 98·6°; pulse 132; resp. 30. The patient was certainly not so sensible after this bath as after former baths; but common sensation and reflex action were quite normal.

27th.—Patient had a convulsion lasting four minutes at 8.15 a.m.; temp. 103·4°. After this she seemed to be so very ill, almost dying, at temperatures she had borne very well before, that it was thought hardly worth while to bath any more, but the temperature increased so steadily that the bath was given again at 10.15 a.m. Bath prepared at 90°, and reduced in thirty-five minutes to 62°, during which time the patient's temperature fell from 107·2° to 100·7°. The pulse and respiration before the bath were 150 and 46. After the bath the former could not be counted. The mucous rattling in the trachea had now passed off. Ten minutes after the bath, temp. 95·2°. An hour and a half after, temp. 96·4°; pulse 116, weak; resp. 44. Four hours and a half after the bath, temp. 100·7°. Answered questions rationally, and put out her tongue when told. Bathed again at 9.20 p.m. Bath prepared at at 90°, and reduced in half an hour to 72°, during which time the patient's temperature fell from 105·3° to 97·4°, and pulse from 152 to 128. A quarter of an hour after the bath, temp. 97·4°; pulse 140; resp. 46. She became quite sensible after this bath. The quinine, which did not seem to have done any good, had not been given regularly lately. The mucous râles over the chest were increasing, and the patient was as weak as she could possibly be.

28th.—She seemed to be gradually dying from exhaustion, with mucous rattling in the trachea, and moist râles over the chest; still the temperature continued to rise as before, so she was bathed again at 9.5 a.m. Bath prepared at 90°, and reduced in fifteen minutes to 73°, during which time the patient's temperature fell from 106·3° to 97·8°; pulse from 160 to 140; and respiration from 52 to 36. Ten minutes after the bath, temp. 95·7°; pulse 136; resp. 38. She rallied very little after this bath, and died at 1.30 p.m. The temperature an hour before death being 99·7°.

A post-mortem examination was made, and nothing whatever was found except a little broncho-pneumonia at the bases of the lungs, and some mucus in the tubes. The brain was particularly firm and healthy.

In this case the temperature was always taken in the axilla except during the first bath, when it was taken in the mouth as well. No doubt this region is not so reliable as the rectum, and this explains some points in which this case differs from those to follow. For instance, there was usually a rapid fall during the first five minutes in the bath, which is much to be doubted; and, again, the lowest temperature was reached *very* soon after the bath. Still, as a whole, the results may be relied on, since the axilla was well surrounded by adipose tissue, by which means it was kept closed and pretty well water-tight during the bath.

Date.	Temperature in axilla.	Pulse.	Respiration.	Remarks.
Nov. 16	101·8	128	32	Sweating, pain in joints.
„ 17	102·6	120	34	„ „
„ 18—				
12 a.m.	104·8	118	40	
3.30 p.m.	105·1			
5·30 „	105·5	120	42	Skin dry, headache, joint pain gone.
9 „	106·3	116	38	
10 „	106·	125	40	Sleeping.
11.20 „	106·2	126	39	
Nov. 19—				
1 a.m.	105·8	—	—	Delirious.

Date.	Temperature in axilla.	Pulse.	Respiration.	Remarks.	
6.30 a.m.	105·5	—	—	Vomiting.	
7 „	105·8	134	40	„	
9 „	106·1	130	38		
10.30 „	106·1	—	—	Answers questions, but not altogether conscious.	
10.55 „	106·1				
				1st Bath, 30 minutes.	
11 „	106·1	—	—	Placed in bath.	
11.2 „	104·3				Temp. in mouth.
11.8 „	103·6	—	—	Bath 86°	104·4°
11.13 „	102·6	—	—	„ 82	103·7
11.16 „	—	104	—	„ 78	
11.18 „	102	—	—	„ 74	103·5
11.20 „	—	108			
11.22 „	101	—	—	„ 74	102·7
11.30 „	98·4	102	—	„ 68	100·3
				Removed from Bath.	
11.45 „	97·9	—	—	Left axilla 96·8°	
11.55 „	98·8	—	—	„ 97·4	
12 „	97·5	—	—	„ 96·8	
12.10 p.m.	98·3	84	—	„ 97·4	
12.50 „	98·8	—	—	„ 97·6	
1.30 „	99·1	90	32	„ 98·8	
2.30 „	100	88	30	„ 100	
3.30 „	101·2	96	32		
4.30 „	101·8				
5.30 „	102·1	104	36		
6.30 „	102·6				
9 „	104	118	35		
9.30 „	104				
11 „	104·8	132	36		
Nov. 20—					
12.30 a.m.	105·1	128	40		
6 „	105·5	—	—	Has passed two motions, and slept quietly on side, but now began to be delirious.	
9.30 „	109·3	—	—	Comatose.	
				2nd Bath, 54 minutes.	
9.43 „	109·4	172	40	Bath 90° [T. by correction, 110°.]	
9.47 „	108·6	—	—	„ 85	
9.54 „	108	—	—	„ 73	
10.2 „	106·8	—	—	„ 65	
10.7 „	105·8	—	—	„ 58	
10.12 „	105·1	—	—	„ 56	
10.17 „	103·7	—	—	„ 54	
10.22 „	102·6	—	—	„ 52	
10.27 „	100·7	—	—	„ 51	
10.32 „	99·8	—	—	„ 51	

Date.	Temperature in axilla.	Pulse.	Respiration.	Remarks.
10.37 a.m.	96·8	—	28	Bath 50
				REMOVED FROM BATH.
10.55 „	95·4	86	—	Pulse counted in temporal, not felt in radial. Collapsed.
11.20 „	92·3	108	—	Temp. in vagina, of urine ditto; pulse radial. Brandy and hot bottles.
11.45 „	92·8	—	—	Vaginal temp.
11.50 „	93·2	—	—	Ditto urine sp. gr. 1012, acid no albumen.
12 „	92·8	—	—	Brandy and beef-tea enema, retained.
12.10 p.m.	93·2			
12.15 „	93·5	—	—	Sensible.
12.20 „	94·1	—	—	Brandy and ammonia.
12.40 „	94·5			
12.50 „	95	94	—	Pulse weak.
1 „	95·6			
1.10 „	96	—	—	Beef tea.
1.35 „	97·7			
1.50 „	97·8			
2 „	98·8	—	—	Beef tea. Wandering, but answers questions.
2.10 „	99·6	112	—	Pulse weak.
2.30 „	100·2	—	—	Shivering.
2.40 „	100·4			
2.50 „	100·6			
3 „	101·4			
3.40 „	102			
4.10 „	102·4			
4.40 „	103·2	118	40	Muscular tremor in arms.
5.10 „	103·5	—	—	Some pain returning in elbows and hips.
5.25 „	104·1	125	40	
5.40 „	104·1	126	43	Face perspiring, tremor continues.
6 „	104·5	127	42	Tremor ceased.
7 „	105·1	126	40	
8 „	105·4	128	39	
9 „	105·6			
9.30 „	105·8	122	34	
10 „	106·2	124	39	
11.30 „	106·6	—	—	Sensible, asked for bath, but rambling.
				3RD BATH, 45 minutes.
11.45 „	106·6	136	36	Bath 90°
11.54 „	105·4	120	—	„ 90
12 „	105·4	—	—	„ 89
Nov. 21—				
12.5 a.m.	104·8	112	—	„ 84
12.10 „	104·6	—	—	„ 80
12.15 „	104·1	116	—	„ 76

Date.	Temperature in axilla.	Pulse.	Respiration.	Remarks.
12.20 a.m.	103·8	—	—	Bath 74
12.25 ,,	102·7	—	—	,, 74
12.30 ,,	101·7	—	—	,, 74
				Removed from Bath.
12.35 ,,	100·2	108	28	
12.50 ,,	99·8			
1 ,,	98·8			
1.15 ,,	98·8	—	—	Milk and beef tea.
1.30 ,,	97·8			
2 ,,	99·4	84	22	Sleeping, pulse good.
3.30 ,,	99·5			
5 ,,	98·6			
6.30 ,,	100·4			
8 ,,	102·6	—	—	Slept well; sensible all night.
10 ,,	104·1	116	40	Bowels acted freely, loose yellow stools.
11.25 ,,	104·2	128	40	
12 ,,	104·5	—	—	Diarrhœa.
1.15 p.m.	105·3	122	42	
2.45 ,,	106 2	122	42	
3.30 ,,	106·6	142	42	
				4th Bath, 50 minutes.
4.30 ,,	106·7	130	36	Bath 90°
4.40 ,,	105	122	40	,, 88
4.45 ,,	104·8	—	—	,, 84
4.50 ,,	104·8	—	—	,, 80
4.55 ,,	104·3	—	—	,, 75
5 ,,	103·9	104	34	,, 72
5.5 ,,	102·8 ?	—	34	,, 72
5.10 ,,	103·2	—	—	,, 72
5.15 ,,	102·8	92	26	,, 70
5.20 ,,	102·4	—	—	,, 70
				Removed from Bath.
5.35 ,,	99			
5.40 ,,	98·7	80	24	
5.50 ,,	98	78	22	
6 ,,	98·4	80	22	
6.30 ,,	99·3	84	24	
7.30 ,,	100			
9 ,,	101	92	20	
10.30 ,,	101·6	—	—	Takes nourishment pretty well.
12 ,,	102	88	26	Sleeping.
Nov. 22—				
1 a.m.	102·2	90	24	,,
2 ,,	101·9	94	24	,,
3 ,,	102·2	94	31	Quite sensible.
5 ,,	102·7			
8 ,,	103·6			
9 ,,	103·5	108	36	Catarrhal conjunctivitis.

Date.	Temperature in axilla.	Pulse.	Respiration.	Remarks.
10 a.m.	102·8	96	34	Patient feeling very comfortable.
11 „	102·8			
12 „	103·1	106	28	
1 p.m.	103·8			
2 „	102·4	104	36	
3 „	103·4	108	32	
4 „	103·3	108	34	
5 „	103·7	120	40	
6 „	102·9	108	40	
7 „	103·8	108	38	
8 „	104·1	116	40	
9 „	104·1	110	38	Not quite so sensible.
10 „	104·7	116	36	Muscular twitchings.
11 „	105	116	38	Sleeping.
12 „	105·1	128	36	Twitchings; not sensible, but takes milk.
Nov. 23—				
1 a.m.	105·6	138	36	
1.30 „	105·8	122	36	Taken milk.
2 „	105·5	128	38	
2.30 „	105·7	124	38	
3 „	105·9	124	40	Twitchings more marked and continuous.
3.30 „	106	126	40	Taken milk.
				5th Bath, 30 minutes.
3.55 „	106	—	—	Bath 90°
4.5 „	103·7 ?	118	—	„ 84
4.10 „	103·4	—	—	„ 80
4.15 „	103·4	102	—	„ 78
4.20 „	103·2	106	—	„ 75
4.25 „	102	—	—	„ 75
				Removed from Bath.
4.35 „	100	—	—	Patient sensible; pulse weak.
4.40 „	99·7	—	26	
4.50 „	99·6	—	—	
5 „	99·7	—	28	Brandy ℥ss every hour.
5.15 „	99·8	100	24	
5.30 „	100·1	106	24	Sleeping.
10 „	102·6	112	29	
11 „	102·9	104	25	
12 „	103·5	124	34	
1 p.m.	104	136	40	
2.15 „	104·8	142	42	
3.30 „	105·7			
4 „	105·9	144	42	Almost unconscious.
5.15 „	106·4	—	—	Passed water involuntarily.
5.50 „	106·2	156	40	
6.50 „	106·1	136	40	

Date.	Temperature in axilla.	Pulse.	Respiration.	Remarks.
8.40 p.m.	106	132	34	Systolic apex bruit.
10.40 „	106	132	34	
12 „	105·9	140	40	
Nov. 24—				
1 a.m.	105·9	136	38	Passed water involuntarily.
2 „	105·6	132	38	Bowels moved.
3 „	105·7	136	38	
4 „	105·8	130	34	
5 „	105·4	144	42	
6 „	105·4	134	39	
7 „	105·4	134	38	
8 „	105·2	140	39	
9.30 „	105·2	136	36	
11 „	105·6	140	40	
12.45 p.m.	106·7	148	42	Tache cerebrale noticed.
1.15 „	106·9	150	40	
1.30 „	106·9	156	42	Bowels moved.
				6TH BATH, 36 minutes.
1.54 „	—	—	—	Bath 90°
2 „	106·5	140	42	„ 90
2.5 „	105·7	—	—	„ 84
2.10 „	105	—	—	„ 80
2.15 „	104·3	—	—	„ 76
2.20 „	104	—	34	„ 74
2.25 „	102·3	—	—	„ 70
2.30 „	100	—	26	„ 70
				REMOVED FROM BATH.
2.40 „	97·7	—	24	
2.50 „	98·3	124	26	Pulse weak.
3 „	98·5			
3.10 „	98·9	96	30	
3.20 „	98·6	—	24	
3.50 „	98·9	112	30	
4.10 „	100			
4.45 „	100·6	—	—	Quinine, grs. x every three or four hours.
5.10 „	100·6			
7.10 „	102	112	30	
9.30 „	102·2	118	32	
11 „	103	128	36	
12 „	103·3	132	42	
Nov. 25—				
1 a.m.	103·5	—	—	Brandy and egg mixture frequently.
1.50 „	104·1	—	38	Ice-bag to head.
2.30 „	104·3	142	38	Patient stares about without appearing to recognise what she looks at.
3.30 „	104·8	148	38	
4.30 „	105·1	144	38	Restless.

Date.	Temperature in axilla.	Pulse.	Respiration.	Remarks.
5.30 a.m.	105·3	144	42	
6.30 „	105·4			
7 „	105·6	144	42	
8 „	105·7	136	40	Quieter.
10 „	105·4	144	34	Nodded her head in answer to a question.
11.45 „	105·7			
12.45 p.m.	106·4	—	—	Spoke in answer.
1.20 „	106·7			
1.45 „	106·8	144	38	
				7TH BATH, 30 minutes.
2 „	106·8	140	38	Bath 90°
2.5 „	105·7	118	—	„ 88
2.10 „	105·3	102	40	„ 85
2.15 „	105·2	—	—	„ 80
2.20 „	104·5	—	32	„ 76
2.25 „	102 ?	—	30	„ 72
2.30 „	102	116	30	„ 72
				REMOVED FROM BATH.
2.40 „	99·9			
2.50 „	99·4	—	—	Shivering.
3 „	99·5			
3.20 „	99·8			
4 „	100·8	104	32	
5 „	101·5	—	28	Bruit not audible.
7.30 „	102·5	124	28	Vomited quinine.
9.30 „	103·5	132	36	
Nov. 26—				
12.30 a.m.	104·1	120	35	
1.30 „	104·6			
3.30 „	105	122	32	Looks about, but will not speak.
4.30 „	105	136	36	Muscular tremor.
6.30 „	106·1	108	38	Convulsive jerkings of arms and jaw.
7.30 „	106·4			
8 „	106·5	142	44	Insensible.
				8TH BATH, 25 minutes.
8.40 „	106·5	142	44	Bath 90°
8.45 „	104·8	—	—	„ 88
8.50 „	—	128	40	„ 85
8.55 „	104	—	—	„ 80
9 „	103·2	—	34	„ 74
9.5 „	102·7	—	—	„ 74
				REMOVED FROM BATH.
9.15 „	97	122	28	
9.22 „	98·4			
9.35 „	98·5			
9.55 „	98·6			
10 „	98·8			

Date.	Temperature in axilla.	Pulse.	Respiration.	Remarks.
11 a.m.	99·1			
12 „	100·4	104	30	Breathing harsh on left side.
12.45 p.m.	—	—	—	Convulsion three quarters of a minute.
1 „	101·3			
2 „	101·4	116	30	
3 „	101·8	120	32	
4 „	102·5	120	32	
5.15 „	103·4	128	34	Unconscious.
7.30 „	106	148	42	Shaking her head, and a monotonous to-and-fro movement of both arms.
8.30 „	106·4	148	42	
				9TH BATH, 25 minutes.
9.20 „	106·7	150	44	Bath 90°
9.25 „	105	—	—	„ 88
9.30 „	104·6	—	—	„ 85
9.35 „	103·7	—	—	„ 83
9·40 „	102·6	140	—	„ 82
9.45 „	100·5	—	—	„ 80
				REMOVED FROM BATH.
9.55 „	98·6	132	30	Not so sensible as after former baths.
10 „	99·1			
10.5 „	99·8	—	—	Common sensation and reflex action good.
10.25 „	100·2	124	30	
10.45 „	100·8	—	—	Moist râles in chest.
11.30 „	100·8	108	28	
12 „	101·3			
Nov. 27—				
1 a.m.	102	114	32	
2 „	102·6	120	34	
3 „	103·4	136	40	Convulsion four minutes.
4 „	104·6	146	36	
5 „	104·8	150	42	Patient seemed to be dying.
6 „	105·6	146	48	
7 „	106·2	150	48	Mucous rattling in trachea.
8 „	106·3	138	48	
9 „	107.2	150	46	
				10TH BATH, 35 minutes.
10.15 „	107·2	—	—	Bath 90°
10.20 „	106·4	—	—	„ 87
10.25 „	105·6	150	—	„ 77
10.30 „	105·4	—	—	„ 70
10.35 „	103·8	—	—	„ 65
10.40 „	103·2	—	—	„ 65
10.45 „	102·2	—	—	„ 65
10.50 „	100·7	—	—	„ 62
				REMOVED FROM BATH.
11 „	95·2	—	—	Mucous rattle has gone off.

Date.	Temperature in axilla.	Pulse.	Respiration.	Remarks.
11.5 a.m.	96·2	—	—	Pulse too weak to count.
11.35 „	96·4	134	—	Pulse very weak.
12.30 „	96·4	116	44	
1.45 p.m.	98·3	118	42	
2.40 „	99·6	124	40	
3.30 „	100·7	—	—	Answers questions sensibly; put out tongue when told.
4.30 „	102·1	120	40	Takes very little nourishment.
6.30 „	103·5	132	48	
7.50 „	104·6	150	48	
9 „	105·3	152	52	Not sensible; mucous rattling in trachea.
				11th Bath, 30 minutes.
9.20 „	105·3	—	—	Bath 90°
9.25 „	104	—	—	„ 89
9.30 „	102·9	144	—	„ 87
9.40 „	102·2	—	—	„ 83
9.50 „	97·4?	128	—	„ 72
				Removed from Bath.
10.5 „	97·4	140	46	
10.15 „	98·7			
10.45 „	99·2	120	42	Pulse very weak.
11.45 „	100·1	134	42	Sensible, but very exhausted.
Nov. 28—				
12.45 a.m.	101·2	122	44	
1.45 „	102·6	122	42	
2·45 „	103·2	152	44	
3.45 „	104·3	156	48	
4.45 „	104·9	160	54	Mucous rattle; not sensible; again seems to be dying.
5.45 „	105·1	172	60	
6.30 „	105·2	—	58	
7.30 „	105·5	144	58	
8.30 „	106·1	160	52	
9 „	106·3			
				12th Bath, 15 minutes.
9.5 „	106·3	—	—	Bath 90°
9.10 „	—	140	36	„ 75
9.15 „	99·5	—	—	„ 74
9.20 „	97·8	—	—	„ 73
				Removed from Bath.
9.30 „	95·7	136	38	
9.35 „	98·4			
10.30 „	99	128	42	The bath gave very little relief.
11 „	99			
12 „	99·3			
12.30 p.m.	99·7			
1.30 „	—	—	—	Died.

The SECOND CASE, though again fatal, is, perhaps, as good an argument in favour of the bath as one could wish for. It shows the rapidly fatal tendency of hyperpyrexia, as well as its occurrence in a case on the simplest and most anciently rational treatment. Unfortunately it was not a hospital case, so that no temperatures were taken until the dangerous symptoms were far advanced.

The wife was able to report that the patient (E. H—, æt. 32) had been laid up through the greater part of December, 1874, with a sore throat, of which he was just becoming convalescent, when an attack of acute rheumatism set in. The attack was well marked and severe, though he was apparently doing well on a simple saline treatment, with Dover's powder at night. Several joints were involved, though the pain rarely stayed in the same joint for more than twenty-four hours at one time. The sweating was profuse, and the rheumatic smell very perceptible.

On the morning of December 31st, when he had been ill about a week, the sweating ceased at about 11 o'clock. In the afternoon the pains in the joints completely disappeared, and he turned over in bed for the first time since the commencement of the attack, telling his wife that he was much better, and perfectly free from pain. But in a few hours he became so violently delirious that it was all a strong man could do to keep him in bed, and this soon subsided into complete insensibility. It was now about 9 o'clock in the evening, and in this state he was first seen. The temperature was at once taken: it registered 108·8° in the axilla. Unfortunately the house had no convenience for immediately bathing the patient, so that at least an hour was lost before a bath and hot and cold water could be procured. The temperature was then 110·9°, and he was violently purged. He was placed in the bath at 90°, and kept in thirty-five minutes, during which time the temperature of the bath was gradually reduced to 66° by adding cold water. At the end of the first eight minutes in the bath the thermometer registered in the rectum 111·4°. From this time to the end of the thirty-five minutes it gradually fell to 106·6°, at which he was removed from the bath. He was still perfectly insensible, with contracted pupils, and rapid breathing (about 50), accompanied with a great deal of noise. Half an hour after the bath, the rectum temperature was 101·3°. An hour after, 99·3°. The next temperature, an hour later, was taken in the axilla, and proved to be rising a little, 100°.

From this time till the afternoon of the next day (January 1st), when he died, the temperature never attained a height of 103° in the axilla, and his condition only altered, by the contraction giving way to a wide dilatation of the pupils. Unfortunately no post-mortem could be obtained.

The THIRD CASE occurred in a medical student (T. A. B—, æt. 22), a well-developed young man in perfect health. First attack.

On the 5th March, 1875, he noticed a pain in his great toe, with a little swelling, which was supposed to be a chilblain.

On the 6th, pain in the right knee, which he treated by sitting in front of the fire, and applying wet cloths.

7th.—Rheumatic fever well marked. Almost all his joints painful; acid sweat and urine, pyrexia, &c.

8th.—The condition obtained yesterday remained until this morning, when the sweating ceased, and the pain in the joints disappeared. At the same time he complained of a burning heat of skin. The temperature, which before had not exceeded 103°, had now risen to nearly 105°. The fact of the sweating and the pain in the joints having ceased, together with a coincident rise of the temperature, pointed so strongly to the probability of a dangerous hyperpyrexia, that he was brought up to the hospital.

When first seen, about 5 p.m., March 8th, his temperature was 104·6°, skin not positively dry, and covered with sudamina; not much actual pain, but considerable stiffness of the joints; quite rational; steady pulse. Urine acid, no albumen. Had been taking an alkaline effervescing mixture. Through the night the temperature rose slowly but surely, and there was no tendency to sleep.

9th.—At 2 a.m. temperature 105·6°; at 3 a.m. 106·4°. Tepid sponging was now suggested; but since previous experience had shown that no ill effect followed bathing, it was determined that, if the temperature rose higher, it should be resorted to. It continued to rise, and he was becoming unconscious. Therefore, at 4.10 a.m., the patient was placed in a bath at 90°, with a temperature of 107·2°, and kept in for twenty minutes, during which time the bath was reduced to 80°, and the patient's temperature to 104°. In one hour and twenty minutes after the bath it had fallen to 99·8° in the axilla. This was only the commencement of a long series of baths, and it may be as well to mention here that in all cases the bath was cooled by adding ice to the water, which is a much pleasanter and less severe method of cooling the bath than by pouring in cold water, and avoids the unpleasant necessity of emptying out the surplus, when using an ordinary bath in a private room, as in this case. Also, the temperature was always taken in the rectum through the bath, and for a short time afterwards; since, for at least half an hour after the bath, there is a marked difference between the surface and the internal temperature, that of the former being considerably below that of the latter. At other times the rectal and axillary temperatures were almost alike, the rectal being only two or three points the higher. When put into the bath, he did not appear sensible to what was being done for him. His skin was dry, and moving him gave rise to no expression of pain. His pulse, I am sure, was comparatively slow, though I regret very much that it does not appear to have been written down in connection with any of the first baths. But I believe I am right in stating that, until it does appear, it rarely if ever exceeded 100 beats in the minute. After the bath there was a little feeling of chilliness, and some blueness of the lips and about the sudamina on the chest, though he described the bathing as most pleasant, having become quite rational in the bath. The effervescing mixture was continued, and he took milk, beef tea, ice, and wine jelly; but no wine nor brandy. The temperature gradually rose again, though there was a little perspiration, and he had some sleep. At 12 noon, temperature 102°. At 4 p.m., 103·8°. At 7 p.m., 105·2°. At 10 p.m., 105.6°. This was the highest point reached until early next morning. Through the night there was the same inability to sleep. The skin was dry: indeed, after the commencement of the hyperpyrexia, there never was any marked sweating until towards the end of the case, though the skin occasionally became moist, and this was particularly noticed after the bath. The urine was still acid, but contained no albumen.

10th.—The temperature continued to be maintained between 105° and 106° for several hours, and it was hoped that this hesitation would result in a natural fall. But no sweating supervened, so it was thought advisable to bath him again with a temperature of 106°. At 7.32 a.m. he was placed in a bath at 90°, which was cooled to 80° in fifteen minutes, during which time the patient's temperature was reduced to 103·6°. Eighteen minutes after the bath, the rectum temperature was 101·3°, while the axillary was 100°. An hour and forty minutes after, the latter registered 100·9°. This rise continued gradually through the day and night, the midnight temperature being just over 104°. Castor oil was administered to-day for constipation, and, since the insomnia continued, grs. xx of chloral hydrat was prescribed as a night draught, but without much effect. The effervescing mixture was continued; but the urine was still acid, no albumen.

11th.—It was not until 2 o'clock this morning that the temperature again reached 105°; but from this it steadily rose, until, at 4.33 a.m., the patient was bathed for the third time with a temperature of 105·8°. The bath was prepared at 90°, and reduced as usual to 80° in fifteen minutes, during which time his temperature fell from 105·8° to 103·8°. In eight minutes more it was 102·6° in the rectum. Forty-two minutes after the bath it was 100·2° in the axilla; but in three quarters of an hour more a rise of one degree had taken place. From this time throughout the whole day the temperature never attained 104°. Chloral was given at night as usual. It produced some sleep, accompanied by wandering, and appeared to be followed by slight lowering of the temperature. The alkaline effervescing draught had been given through the day. The urine was faintly alkaline, no albumen. Fæces clay coloured.

12th.—The temperature still kept down; indeed, at 12.30 p.m. it had fallen to 102·8°. Unfortunately, the fall was only temporary, and at midnight the thermometer registered 104·8° in the axilla. He had taken the chloral, and there was a little delirium. The nourishment and effervescing draught continued as before.

13th.—Again a fall in the early morning to 102·6° at 4.30. At noon, temperature 104·4°; pulse 80. At 9.30 p.m., temperature 105°, when chloral grs. xx was given. The temperature continued to rise slowly until midnight. Effervescing mixture and nourishment as before. Urine faintly alkaline.

14th.—At 12.30 a.m. the temperature was 105·8°, so the fourth bath was prepared, and the patient placed in it at three minutes past 1. The bath was given this time at 95°, and reduced to 84° in twenty minutes, during which time the patient's temperature fell from 105·1° to 103·8°. It was taken in the rectum four times after the bath, namely, a quarter, half, one, and one hour and a half after, and registered respectively 101·7°, 100·7°, 100°, and 100·4°; the last temperature being the commencement of the next rise, which continued steadily until noon, when it remained stationary for several hours at 104·8°, with a pulse of 96. Urine faintly alkaline, no albumen, phosphates, sp. gr. 1023. Effervescing mixture continued.

15th.—The temperature did not alter much until noon, when it rose to 105·6°, and the pulse to 104. The temperature had now been nearly 105° for twenty-four hours. He was constantly delirious, sometimes having to be kept in bed. To-day the urine was strongly alkaline, so the effervescing mixture was stopped. Stimulant was commenced in the form of port wine, half an ounce every hour; but in a few hours this was increased to one ounce per hour. Marked subsultus noticed to-day for the first time. At 1.28 p.m. the patient was placed in a bath at 94°, with a temperature of 105.5°. In nineteen minutes the bath was reduced to 81°, and the patient's temperature to 103·5°. Twenty-two minutes after the bath it had fallen to 99·6°, and the pulse to 76. In forty minutes more the rise commenced, the temperature at 2.45 p.m. being 100°, while the pulse remained the same, 76. The rise was more rapid to-day, 105·2° being attained before midnight, with a pulse of 104.

16th.—At 1.10 a.m. another bath was given. The bath was prepared at 94° and reduced to 85°, being continued for twenty minutes, in which time the patient's temperature fell from 105·6° to 103·4°, and the pulse from 104 to 90. Half an hour after the bath the temperature fell to 101°, and the pulse to 82. This bath was followed by a rapid rise, 105° being attained in four hours and three quarters (6.15), with a pulse of 116. In another hour the temperature was 105·2°, and the pulse 122. Then a natural fall occurred, and from 11 a.m. till noon 103·8° was maintained, with a pulse 102; but from noon till evening a rise again occurred; at 8 p.m. the temperature being 105·1°, and the pulse 128. At 9.27 he was again bathed. Bath prepared at 95°, and reduced to 85° in twenty-one minutes, during which time the patient's temperature fell from 105·6° to 103·5°, and the pulse to 98. Three quarters of an hour after the bath the lowest point was reached, namely, 100·8°, when the usual rise recommenced. In another hour it was 101·4°; pulse 100. Delirium and subsultus were almost continuous to-day, but he became sensible as the temperature was reduced by the bath. Frequently fed with wine, milk, and beef tea, as before. Chloral draught in the evening. The first sound of the heart was not quite clear.

17th.—The temperature went up rapidly after the last bath, so that at 5.26 a.m. it was found necessary to bath again. Bath prepared at 94°, and reduced to 84° in twenty-two minutes, in which time the temperature fell from 106° to 104°, and the pulse from 116 to 104. Twelve minutes after the bath the temperature in the rectum was 100·4°; pulse 96. This bath was followed by a free perspiration, much more than usual; but it did not last long enough to check the rise much. Up to the present time he had been fed very frequently with beef tea, milk, and port wine. Now the food was given in stated quantities every quarter of an hour: thus, port wine 1 oz., turtle soup 1 oz., brandy-mixture 1 oz., beef tea 1 oz. Besides this, milk was frequently given, and occasionally Apollinaris water. The motions continued to be clay coloured, with a tendency to constipation.

At noon the temperature had risen to 105·5°, and the pulse to 122. At 1.20 the bath was repeated. Prepared at 96°, and reduced to 84° in twenty-two minutes, during which time the patient's temperature fell from 106·5° to 103·6°, and the pulse from 134 to 116. Eighteen minutes after the bath the rectum temperature was 101·2°; pulse 112. Three quarters of an hour after it was 101·4° in the axilla; pulse 108. Again a rapid rise occurred, and another bath was given at 7.13 p.m.; prepared at 95°, and reduced to 83° in twenty-six minutes, during which time the patient's temperature fell from 106·2° to 104°, and the pulse from nearly 130 to something below 112. Sixteen minutes after the bath the rectum temperature was 99·6°; pulse 84. In another hour the rise was fairly established, the temperature being 101·4°, and the pulse 106. There was a good deal of a rambling sort of delirium constantly present. He took very little notice of anyone, and the insomnia had changed to a drowsy condition. Took nourishment regularly every quarter of an hour without any trouble, and became sensible as the temperature was reduced in the bath. At midnight the temperature was 104·4°; pulse 110.

18th.—Bathed at 1.35 a.m. Bath prepared at 95°, and reduced to 84° in twenty minutes, the patient's temperature falling from 106·2° to 103·3°, and the pulse from 146 to something less than 106. Thirty-five minutes after the bath the rectum temperature was 100°, and the pulse 100. In half an hour more, the rectum temperature was 102°, but the pulse only 88.

At 7.10 a.m. he was bathed again. Bath prepared at 95°, and reduced to 84° in twenty minutes, his temperature falling from 106·7° to 103·2°, and his pulse from 132 to something between 108 and 112. Half an hour after the bath the rectum temperature was 101°, and the pulse 108. At 1.5 p.m. the bath was again repeated; prepared at 94°, and reduced to 84° in twenty-five minutes, his temperature falling from 106·2° to 103·8°, and the pulse from 120 to 96. In half an hour the rectum temperature was 101·4°. At 9.40 p.m. another bath, prepared at 95°, and reduced to 84° in twenty-two minutes, patient's temperature falling from 106·8° to 103·6°, and the pulse from 120 to 98. In a quarter of an hour the rectum temperature was 100·7°; pulse 80.

The general condition was much the same as the day before. He became more or less sensible in each bath. By this time he had wasted considerably, his appearance had altered very much, and his prospect of recovery seemed exceedingly doubtful; but he still continued to take the nourishment every quarter of an hour without trouble. In addition, two grains of quinine every three hours was ordered to-day, and milk was entirely discontinued.

19th.—Bathed at 5.17 a.m. Bath prepared at 95°, and reduced to 85° in twenty-two minutes, during which time his temperature fell from 126·6° to 103·4°, and the pulse from 120 to something under 100. Twenty-two minutes after the bath the rectum temperature was 101°, and the pulse 86.

Bathed at 11.11 a.m. Bath prepared at 96°, and reduced to 84° in twenty-one minutes, during which time his temperature fell from 106·6° to 103·7°, and the pulse from 120 to 94. Thirteen minutes after the bath the rectum temperature was 101·4°.

Bathed at 4.45 p.m. Bath prepared at 96°, and reduced to 84° in twenty-one minutes, during which time his temperature fell from 106·5° to 103·6°. Ten minutes after the bath the temperature was 101·2° in the rectum, and in another forty minutes it was the same in the axilla; pulse 96. His face looked decidedly brighter to-day. The subsultus remained constantly; but not so much delirium. Still drowsy, but more sweating.

20th.—The day opened with a temperature of 105°, and at 1.5 a.m. he was bathed. Bath prepared at 94°, and reduced in seventeen minutes to 85°, during which time the patient's temperature fell from 106·2° to 103·5°, and the pulse from 110 to 88 Eighteen minutes after the bath the rectum temperature was 101·8°, and in two hours more it was still the same in the axilla; pulse 84.

Bathed at 7.24 a.m. Bath prepared at 96°, and reduced in twenty-one minutes to 86°, during which time the patient's temperature fell from 106·5° to 103·8°. The pulse was only 106 before the bath, and had fallen to 82 ten minutes after. An hour and a quarter after the bath the temperature was 101°, and the pulse 80. In another hour, temp. 102·2°; pulse 80. From this time till 5.45 the temperature gradually rose: it was then 105·4°; pulse 98. Then for a few hours there was a slight fall, the temperature being only 104·6° at 11.15 p.m., and the pulse having kept below 100 all the time.

Notwithstanding the continuous elevation of temperature, the brightened up appearance of yesterday was continued, and the pulse was decidedly lower with the high temperatures. There was more perspiration. The urine was examined for alcohol, but none was found; it appeared also in all other respects normal.

21st.—The day again began with a high temperature, soon requiring a bath, which was prepared at 12.43 a.m. at 95°, and reduced in twenty-one minutes to 86°, during which time the patient's temperature fell from 105·9° to 103·9°, and the pulse from 106 to 82. Sixteen minutes after the bath the rectal temperature was 100·4°. In another hour the axillary temperature was only 100°, but in half an hour more 101·6°.

Bathed at 8.25 a.m. Bath prepared at 95°, and reduced to 85° in twenty-one minutes, during which time the patient's temperature fell from 106·6° to 103·4°, and the pulse from about 100 to 82. Twenty-four minutes after the bath the rectal temperature was 100·6°. An hour after, the same in the axilla. Two hours after, 101·7°.

Bathed at 5.18 p.m. Bath prepared at 94°, and reduced in twenty-one minutes to 85°, during which time the patient's temperature fell from 105·8° to 103·3°, and the pulse from 96 to below 86. Ten minutes after the bath the rectal temperature was 100·8°. Forty minutes after the axillary was 100·6°, and in an hour and a half more, 101·7°; pulse 78. He was still looking better, though three baths were necessary in the twenty-four hours. He was getting more sensible, the continuous delirium through the day having disappeared. There was more perspiration, and he was thirsty, and relished iced brandy and Apollinaris water very much. He took his nourishment well, though he was getting tired of the continuous feeding. For the last three days he had been a little deaf. His brandy mixture was changed for brandy ʒij in iced Apollinaris water, and port wine reduced to ℥ss every hour.

22nd.—He began to-day with a temperature of 104°, but the rise was much slower so that the bath was deferred until 5.46 a.m. Bath prepared at 95°, and reduced to 86° in nineteen minutes, during which time the patient's temperature fell from 106·1° to 103·4°, and the pulse from about 104 to 84. A quarter of an hour after the bath the rectal temperature was 101·8°; pulse 80. An hour after, 101·2°; pulse 80; and two hours after it was 101·6° in the axilla; pulse 88. The temperature got up again in the afternoon, it being 105·2° at 3 p.m.; pulse 98. But in the evening a natural fall occurred. At 5.30 it was 102·8°; pulse 100. At 6.45, 103·4°; pulse 100. At 10.45, 102·8°; pulse 90.

To-day, again, he seemed better, but the safest indication of it was the lower range of temperature and the continued steady condition of the pulse. The doubtful character of the first heart sound remained all along.

23rd.—The day opened with a similar temperature to yesterday, 104°; but it resulted sooner in a bath. Bath given at 3.10 a.m.; prepared at 95°, and reduced in twenty-four minutes to 86°, during which time the patient's temperature fell from 106·4° to 103°, and the pulse from about 100 to 82. Half an hour after the bath the temperature was 100·6° in the rectum. An hour and a half after it was 101° in the axilla; pulse 80. Through the rest of the day the temperature varied, but never exceeded 104·8°. All other conditions remained about the same as yesterday.

24th.—Temperature nearly 105°; pulse 100. Bathed at 3.37 a.m. Bath prepared at 96°, and reduced in twenty-four minutes to 84°, during which time the patient's temperature was reduced from 106·2° to 103·8°, and the pulse from 108 to below 86. An hour after the bath the temperature had fallen to 100·4°, and the pulse to 76. Two hours after, temp. 101°. Through the rest of the day the temperature fluctuated as it did yesterday, but never exceeded 104°, nor the pulse 92. The patient's condition was becoming more satisfactory; noticeably, he was looking very much better, though considerably emaciated. He was anxious for a change in his diet, and longed heartily for a pint of ale and a pipe.

25th.—The temperature was below 103°, but on a steady increase. Bathed at

7.26 a.m. Bath prepared at 97°, and reduced in twenty-four minutes to 85°, during which time the patient's temperature fell from 106·9° to 103·4°, and the pulse from a little above 100 to a little above 80. Forty minutes after the bath the temperature was 100·6° in the rectum. An hour after, 99·8° in the axilla. Two hours and a half after, 101·8°; pulse 80. The temperature varied through the day, not exceeding 104·6°, nor the pulse 100. Although this was a somewhat higher range than yesterday, still there was no other evident condition of relapse shown by the patient. He continued to progress very satisfactorily.

26th.—Temp. 103·4°, pulse 90, at the opening of the day. This ran on to 104·6° at 6 a.m. Fell throughout the whole day to 101° at 8.15 p.m.; pulse 80. This fall was the most marked step towards convalescence that had yet appeared. No bath was given to-day, for indeed that of yesterday was the last found to be necessary.

27th.—The day commenced with a temperature of about 102°; pulse 82. At 4 a.m., temp. 104°. At 7 a.m., 105°; pulse 96. Then it fell through the day till 9 p.m., when it was 101·4°.

28th.—Opened with a little higher temperature than yesterday, 103°, but only reached 104° at 3.30 a.m. Fell to 102·8° at 10.45 a.m.; pulse 84. At 1 p.m. 103°. At 3.30 p.m. 101·7°; from which time until midnight a slow rise took place. The quinine was changed to day for—

Ferri et Quiniæ Cit. gr. v;
Sp. Chloroformi ♏x;
Syr. Limoni ʒj;
Ex Aqua ad ℥j; t. d. s.
with Mannæ ʒj;
Tinct. Card. co. ʒj;
Ex haust. Sennæ ad ℥iss, Ft. haust.; p. r. n.

29th.—The gentle rise of yesterday evening attained a height of 103·6° by midnight; pulse 92. This fell to 103·1° at 2.30 a.m.; pulse 88; but rose again to 104·4° at 6 a.m. From which time until 3.45 p.m. it steadily fell to 101·8°; pulse 90. This was followed by only a very slight rise in the evening. The general condition of the patient was improving in every respect.

30th.—To-day he started with a temperature of only 102°, and it only reached 103·8° through the day. This was attained at 9.15 a.m., with a pulse of 90. At 3.30 p.m., 102.2°; pulse 86. At 10 p.m., 103°; pulse 92.

31st.—The highest temperature reached to-day was 103·4°; pulse 92. The regular method of frequent feeding was given up, and the alcohol was commenced to be diminished.

April 1st.—The right wrist and ankle were a little swollen and painful. The temperature ran up to 104° at 7.30 a.m., but fell to 102·4° at 2 p.m.

2nd.—The slight relapse of yesterday proved of no particular consequence, though the pain remained. The highest temperature reached to-day was 103°; pulse 94 in the early morning; the lowest 101·8° at 11 p.m.

3rd.—The highest temperature was 103·2° at 12 noon; pulse 84. The lowest at 3 p.m., 102·6°. The pulse got up to 122 in the evening, due to stimulant.

4th.—Highest temperature at 4.15 a.m., 103·2°. Lowest at 1 p.m., 100·8°. In the evening the pulse got up to 110, after stimulant.

5th.—Highest temperature 103·2°, at 2.30 a.m. Lowest 100·6°, at 10.45 p.m.; pulse did not exceed 96.

6th.—Temperature only reached 101·2°; pulse 100. The pain in the wrist and ankle entirely disappeared.

7th.—Temp. 102·2°; pulse 104. Milk again added to the diet.

8th.—Temp. 102°; pulse in the morning ran up to 130, after stimulant. Toast and butter allowed. Champagne, sherry and Apollinaris water added to diet of milk, beef tea, &c. Brandy, and port wine stopped.

9th.—Highest temperature 103°; pulse 116.

10th.—Temp. 101·6°; pulse 104.

11th.—Temp. 102°; pulse 106.

12th.—Temp. 99·6°; pulse 92. Systolic bruit at base.

13th.—Temp. 99·8°; pulse 84. Oysters allowed.

14th.—Temp. 98·8°; pulse 88.

18th.—Fish diet.

21st.—Chicken.

22nd.—Chop. Patient quite convalescent.

Temperature Chart of Case 3.

Date.	Temp.	Rectum or axilla.	Bath.	Pulse.
Mar. 8—				
5 p.m.	104·6	Ax.		
9 „	105	„		
10 „	105	„		
11 „	105·5	„		
12 „	105·5	„		
Mar. 9—				
1·30 a.m.	105·8	„		
2.30 „	106·4	„		
3.30 „	106·7	„		
4 „	106·6	„		
4.10 „	107·2	„		
			I.	
4.30 „	—	—	90°	
4.40 „	107·3	Rec.		
4.45 „	106·1	„		
4.50 „	104	„	80	
5 „	99·1	Ax.		
5.5 „	101·7	Rec.		
5.25 „	100·4	Ax.		
6.10 „	99·8	„		
6.45 „	100·2	„		
7.45 „	100·4	„		
9.10 „	101·2	„		
12 „	102	„		
1 p.m.	102·4	„		
2 „	103·4	„		
2.45 „	103·5	„		
4 „	103·8	„		
5 „	104·8	„		
6.15 p.m.	105	Ax.		
7 „	105·2	„		
7.30 „	105·2	„		
8.30 „	105·4	„		
9.15 „	105·4	„		
9.15 „	105·6	Rec.		
10 „	105·6	Ax.		
11 „	105·4	„		
11.50 „	105·4	„		
Mar. 10—				
12.30 a.m.	105·2	„		
1.15 „	105	„		
2 „	105·4	„		
3 „	105·6	„		
3.30 „	105·8	„		
3.45 „	105·6	„		
3.45 „	106·2	Rec.		
4.30 „	105·6	Ax.		
5 „	105·6	„		
5.45 „	105·8	„		
6.15 „	106	„		
6.50 „	105·8	„		
7 „	106·3	Rec.		
7.30 „	106	„		
			II.	
7.32 „	—	—	90°	
7.36 „	105·7	„	83	
7.39 „	105	„	81	
7.42 „	104·4	„	80	
7.45 „	103·7	„	80	

Date.	Temp.	Rectum or axilla.	Bath.	Pulse.
7.47 a.m.	103·6	Rec.	80	
8.1 ,,	101·8	,,		
8.5 ,,	101·3	,,		
8.5 ,,	100	Ax.		
9.30 ,,	100·9	,,		
10.30 ,,	100·8	,,		
11.30 ,,	101·2	,,		
12.30 p.m.	101·8	,,		
1.30 ,,	102·2	,,		
2.30 ,,	102·6	,,		
3.30 ,,	103	,,		
4.30 ,,	103·2	,,		
5.30 ,,	103·2	,,		
6.30 ,,	103·8	,,		
7.30 ,,	103·8	,,		
8.30 ,,	104·1	,,		
9.30 ,,	104·1	,,		
10.30 ,,	104·2	,,		
11.30 ,,	104·4	,,		
Mar. 11—				
1 a.m.	104·6	,,		
2.20 ,,	105·1	,,		
3 ,,	105·3	,,		
4 ,,	105·4	,,		
4.30 ,,	105·8	Rec.		
			III.	
4.33 ,,	—	—	90°	
4.36 ,,	105·8	Rec.	82	
4.39 ,,	105	,,	82	
4.43 ,,	104·5	,,	80	
4.45 ,,	103·8	,,	80	
4.48 ,,	—	—	80	
4.56 ,,	102·6	Rec.		
5.30 ,,	100·2	Ax.		
7.15 ,,	101·2	,,		
8.30 ,,	102	,,		
9·30 ,,	102·6	,,		
10.30 ,,	102·6	,,		
11.30 ,,	103·2	,,		
12.30 p.m.	103·2	,,		
1.30 ,,	103·3	,,		
2.30 ,,	103·8	,,		
3.30 ,,	103·8	,,		
4.30 ,,	103·6	,,		
5.30 ,,	103·4	,,		
6·45 ,,	103·6	,,		
7.35 ,,	103·8	,,		
9.10 p.m.	103·5	Ax.		
10.30 ,,	103·5	,,		
11.30 ,,	103·6	,,		
Mar. 12—				
1 a.m.	103·8	,,		
3.30 ,,	103·2	,,		
6 ,,	102·4	,,		
8 ,,	103·2	,,		
10 ,,	103·4	,,		
12.30 p.m.	102·8	,,		
3 ,,	103·4	,,		
6 ,,	104·2	,,		
7 ,,	104·4	,,		
8 ,,	104·5	,,		
9.35 ,,	104·6	,,		
10.30 ,,	104·6	,,		
11.30 ,,	104·8	,,		
Mar. 13—				
12.20 a.m.	104·8	,,		
1.30 ,,	104·6	,,		
3 ,,	103·5	,,		
4.30 ,,	102·6	,,		
5.30 ,,	103·1	,,		
7.30 ,,	104	,,		
8.30 ,,	104	,,		
9.30 ,,	104·2	,,		
10.30 ,,	104	,,		
12.30 p.m.	104·4	,,	—	80
3 ,,	104·8	,,	—	96
5.30 ,,	104·8	,,	—	98
7.30 ,,	104·7	,,		
8.30 ,,	104·9	,,		
9.30 ,,	105	,,		
10.30 ,,	105·2	,,		
11.30 ,,	105·2	,,		
Mar. 14—				
12.30 a.m.	105·8	,,		
			IV.	
1.13 ,,	—	—	95°	
1.16 ,,	105·8	Rec.	95	
1.20 ,,	105·6	,,	90	
1.24 ,,	105	,,	86	
1.28 ,,	104·3	,,	85	
1.31 ,,	103·6	,,	84	
1.33 ,,	—	,,	84	
1.46 ,,	101·7	,,		
2.4 ,,	100·7	,,		
2.30 ,,	100	,,		

Date.	Temp.	Rectum or axilla.	Bath.	Pulse.
3.5 a.m.	100·4	Rec.		
4 „	101·7	Ax.		
5 „	102·3	„		
6 „	103·2	„		
7 „	103·6	„		
8 „	104	„		
9 „	104	„		
10 „	104·2	„		
12 „	104·8	„	—	96
1 p.m.	104·8	„	—	98
2.15 „	104·8	„	—	92
3.30 „	104·8	„	—	96
4.50 „	104·8	„		
5.50 „	104·8	„		
6.50 „	104·8	„		
8 „	104·9	„		
9 „	104·9	„		
10 „	104·6	„		
11.20 „	104·7	„		
Mar. 15—				
12.20 a.m.	104·8	„		
1.30 „	104·8	„		
2.30 „	104·5	„	—	90
3.30 „	104·6	„		
4.45 „	104·6	„		
5.45 „	104·7	„		
6.40 „	105·2	„		
7.10 „	105·2	„		
8.30 „	105	„		
9.15 „	105	„	—	96
10.15 „	105	„	—	96
11.30 „	105	„		
12.30 p.m.	105·6	„	—	104
1.25 „	105·5	Rec.		
			V.	
1.28 „	—	—	94°	
1.32 „	105·5	Rec.	94	106
1.35 „	105·1	„	88	
1.38 „	104·8	„	84	
1.40 „	104·4	„	82	88
1·43 „	103·5	„	81	
1.47 „	—	„	81	
1.52 „	101·6	„	—	84
2.5 „	99·6	Ax.	—	76
2.45 „	100	„	—	76
3.30 „	100·6	„	—	86
4.15 „	101·2	„	—	82

Date.	Temp.	Rectum or axilla.	Bath.	Pulse.
5.30 p.m.	101·8	Ax.	—	84
6.30 „	102·2	„		
7.30 „	102·2	„		
8.30 „	103	„		
10 „	104	„	—	96
11 „	104·8	„	—	100
12 „	105·2	„	—	104
Mar. 16—				
1.4 a.m.	105·6	Rec.		
			VI.	
1.10 „	—	—	94°	
1.14 „	105·6	Rec.	94	
1.17 „	105·4	„	89	100
1.21 „	104·6	„	86	
1.24 „	104·1	„	85	
1.27 „	103·7	„	85	90
1.30 „	103·4	„	85	
1.43 „	102	„		
2 „	101	Ax.	—	82
3.45 „	102·6	„	—	96
6.15 „	105	„	—	116
6.45 „	105	„	—	122
7.15 „	105·2	„	—	122
9 „	104·6	„	—	124
9.50 „	104·5	„		
11 „	103·8	„	—	102
12 „	103·8	„	—	102
1 p.m.	104	„		
2 „	104·2	„		
3 „	104·2	„	—	104
4 „	104·4	„	—	104
5 „	104·5	„	—	110
6 „	104·8	„	—	120
7 „	104·8	„	—	120
8 „	105·1	„	—	128
9 „	105	„		
9.24 „	105·6	„	—	118
			VII.	
9.27 „	—	—	95°	
9.32 „	105·4	Rec.	94	
9.36 „	105·2	„	89	
9.40 „	105·2	„	85	
9.44 „	103·5	„	85	98
9.48 „	—	„	85	
10.5 „	101·8	„		
10.30 „	100·8	Ax.		

Date.	Temp.	Rectum or axilla.	Bath.	Pulse.
11.30 p.m.	101·4	Ax.	—	100
Mar. 17—				
12.30 a.m.	102	„	—	100
1.30 „	103·7	„	—	120
2.30 „	103·7	„	—	116
3.30 „	104·6	„	—	116
4.30 „	106	„	—	116
5 „	105·6	„	—	118
5.25 „	106	Rec.	—	116
			VIII.	
5.26 „	—	—	94°	
5.31 „	106·1	Rec.	94	
5.34 ,	105·8	„	90	
5.37 „	105·7	„	86	
5.41 „	105·4	„	85	
5.44 „	104·5	„	84	104
5.47 „	104	„	84	
5.48 „	—	„	84	
6 „	100·4	„	—	96
7 „	101·4	Ax.	—	100
8.45 „	102·8	„	—	112
9.45 „	103·4	„	—	112
10.45 „	104·4	„	—	112
11.45 „	105·4	„	—	120
12.45 p.m.	105·8	„	—	124
1 „	106	„	—	134
1.15 „	106·2	Rec.		
			IX.	
1.20 „	—	—	96°	
1.24 „	106·5	Rec.	96	
1.28 „	106·3	„	92	
1.32 „	105·8	„	89	
1.35 „	105·3	„	85	
1.39 „	104	„	84	
1.42 „	103·6	„	84	116
2 „	101·2	„	—	112
2.30 „	101·4	Ax.	—	108
3.30 „	103·2	„	—	112
4 „	103·8	„	—	120
4.30 „	104·4	„	—	120
5.30 „	105·2	„	—	126
6.30 „	105·8	„	—	122
6.30 „	106	Rec.		
7.12 „	106·2	„		
			X.	
7.13 „	—	—	95°	
7.18 „	106·2	Rec.	95	
7.22 p.m.	106	Rec.	93	116
7.26 „	105·6	„	89	
7.30 „	105	„	86	112
7.34 „	104·2	„	84	
7.38 „	104	„	83	
7.39 „	—	—	83	
7.55 „	99·6	Rec.	—	84
8.55 „	101·4	Ax.	—	106
9.55 „	102·4	„	—	110
10.30 „	103·2	„	—	112
11.30 „	104·4	„	—	110
Mar. 18—				
12.30 a.m.	105	„	—	120
1.34 „	106·2	„	—	146
			XI.	
1.35 „	—	—	95°	
1.38 „	106·2	Rec.	95	
1.42 „	105·9	„	90	
1.45 „	105·8	„	88	
1.48 „	105·6	„	84	106
1.52 „	104	„	84	
1.55 „	103·3	„	84	101
2·15 „	101	„		
2.30 „	100	„	—	100
3 „	102	„	—	88
3.30 „	102·6	Ax.	—	120
4.30 „	103·4	„	—	100
5.30 „	104·8	„	—	108
6 „	105·4	„	—	120
6.30 „	106	„	—	100
6.55 „	—	—	—	134
7.8 „	106·4	Rec.		
			XII.	
7.10 „	—	—	95°	
7.13 „	106·7	Rec.	95	
7.16 „	106·2	„	90	
7.20 „	105·7	„	88	112
7.23 „	104·9	„	85	
7.26 „	103·9	„	84	
7.30 „	103·2	„	84	
7.40 „	101	„		
8 „	101	„	—	108
8.30 „	101·6	„		
9 „	102	Ax.	—	100
9.45 „	103·4	„	—	106

Date.	Temp.	Rectum or axilla.	Bath.	Pulse
10.30 a.m.	104	Ax.	—	106
11.30 „	105	„	—	128
12.20 p.m.	105·6	„	—	120
1.3 „	106	„		
			XIII.	
1.5 „	—	—	94°	
1.9 „	106·2	Rec.	94	
1.13 „	106·2	„	91	
1.17 „	105·9	„	89	102
1.20 „	105·5	„	86	
1.23 „	104·6	„	84	
1.26 „	104	„	84	
1.29 „	103·8	„	84	96
1.30 „	—	—	84	
1.45 „	101·4	Rec.		
2 „	101·4	„		
3 „	102·2	Ax.	—	100
4 „	103·2	„	—	104
5 „	104	„	—	108
6 „	104·8	„	—	110
7 „	105·2	„	—	120
8 „	105·2	„	—	120
9 „	105·8	„	—	120
9.35 „	106·2	Rec.		
			XIV.	
9.40 „	—	„	95°	
9.43 „	106·3	„	94	
9.47 „	105·9	„	93	
9.50 „	105·7	„	90	102
9.53 „	105·2	„	87	
9.56 „	104·9	„	85	
9.59 „	104·4	„	84	98
10.2 „	103·6	„	84	
10.17 „	100·7	„	—	80
11 „	101·6	Ax.		
Mar. 19—				
12.30 a.m.	104	„	—	101
1.30 „	105	„	—	102
2.45 „	105·2	„	—	108
3.45 „	105·3	„	—	106
4.45 „	106	„		
5.15 „	106·6	Rec.	—	120
			XV.	
5.17 „	—	—	95°	
5.20 „	106·6	Rec.	95	
5.26 „	106	„	90	

Date.	Temp.	Rectum or axilla.	Bath.	Pulse.
5.29 a.m.	105·4	Rec.	88	100
5.32 „	104·6	„	86	
5.35 „	104	„	85	
5.38 „	103·4	„	85	
5.39 „	—	„	85	
6 „	101	„	—	86
7 „	102·1	Ax.		
8 „	103·2	„		
9 „	104	„		
10 „	105·1	„	—	112
10.30 „	105·6	„		
11 „	106·2	„		
11.9 „	106·2	Rec.	—	120
			XVI.	
11.11 „	—	—	96°	
11.14 „	106·6	Rec.	96	
11.17 „	106·6	„	94	100
11.20 „	106	„	90	
11.23 „	105·5	„	86	
11.26 „	104·7	„	84	
11.29 „	103·9	„	84	
11.32 „	103·7	„	84	94
11.45 „	101·4	„		
1 p.m.	102·4	Ax.		
2 „	103	„		
3 „	104·2	„	—	96
4.15 „	104·7	„	—	100
5.15 „	105·5	„	—	102
5.45 „	106·2	Rec.		
			XVII.	
5.50 „	—	—	96°	
5.53 „	106·5	Rec.	96	
5.56 „	106·2	„	92	
5.59 „	105·8	„	90	
6.2 „	105·2	„	88	
6.5 „	104·5	„	86	
6.8 „	104·2	„	84	
6.11 „	103·6	„	84	
6.20 „	101·2	„		
7 „	101·2	Ax.	—	96
7.30 „	102	„	—	96
8.30 „	102·8	„	—	96
9.30 „	103·8	„	—	101
10.30 „	104·5	„	—	92
11.30 „	105·2	„	—	100

Date.	Temp.	Rectum or axilla.	Bath.	Pulse.
Mar. 20—				
12.45 a.m.	105·9	Ax.	—	110
1.3 „	106·1	Rec.		
			XVIII.	
1.5 „	—	—	94°	
1.8 „	106·2	Rec.	94	102
1.11 „	105·8	„	91	
1.15 „	105	„	88	88
1.18 „	104·3	„	87	
1.22 „	103·5	„	85	
1.40 „	101·8	„		
2.40 „	101·9	Ax.	—	84
3.40 „	101·8	„	—	84
4.40 „	103·8	„	—	90
5.40 „	105·1	„	—	100
6.40 „	106	„	—	104
7.12 „	106·4	„	—	106
			XIX.	
7.24 a.m.	—	—	96°	
7.27 „	106·5	Rec.	96	104
7.30 „	106·3	„	93	
7.33 „	105·9	„	89	
7.36 „	105·2	„	86	
7.39 „	104·6	„	86	
7.42 „	103·9	„	86	
7.45 „	103·3	„	86	
7.55 „	102·4	Ax.	—	82
9 „	101	„	—	80
10 „	102·2	„	—	80
11 „	102·9	„	—	88
12 „	103·3	„		
1 p.m.	103·9	„	—	96
2.30 „	104·5	„	—	96
3.30 „	105·2	„	—	98
4.30 „	105·2	„		
5.45 „	105·4	„	—	98
6.25 „	105·2	„		
7.45 „	105·2	„	—	98
8.45 „	104·8	„	—	96
9.45 „	104·8	„		
11.15 „	104·6	„		
Mar. 21—				
12.15 a.m.	105·8	„	—	102
12.35 „	105·9	Rec.	—	106
			XX.	
12.43 „	—	—	95°	
12.46 a.m.	105·9	Rec.	95	
12.49 „	105·9	„	93	98
12.52 „	105·7	„	90	
12.55 „	105·2	„	86	
12.58 „	104·4	„	86	
1.1 „	103·9	„	86	
1.4 „	—	—	86	
1.20 „	100·4	Rec.	—	82
2 „	100·5	Ax.		
2.30 „	100	„		
3.30 „	102	„		
4.30 „	102·5	„	—	82
5.30 „	103·6	„		
6.30 „	104·6	„		
7.30 „	105·6	„	—	98
8 „	106·1	„		
			XXI.	
8.25 „	106.6	Rec.	95°	
8.28 „	106·6	„	95	
8.31 „	106·4	„	92	
8.34 „	106	„	88	
8.37 „	105·4	„	86	92
8.40 „	104·5	„	85	
8.43 „	103·8	„	85	82
8.46 „	103·4	„	85	
9.10 „	100·6	„		
9.50 „	100·6	Ax.		
11 „	101·7	„		
12 „	103	„		
1 p.m.	103·6	„		
2.15 „	104·4	„	—	96
3.15 „	104	„	—	96
4.15 „	105·4	„	—	96
4.15 „	105·6	„	—	96
			XXII.	
5.18 „	105·7	Rec.	94°	
5.24 „	105·8	„	94	
5.27 „	105·2	„	92	
5.30 „	104	„	90	86
5.33 „	104·1	„	88	
5.36 „	103·7	„	85	
5.39 „	103·3	„	85	
5.50 „	100·8	„		
6.30 „	100·6	Ax.		
8 „	101.7	„	—	78

Date.	Temp.	Rectum or axilla.	Bath.	Pulse.
9 p.m.	102	Ax.	—	86
10.30 „	103·1	„	—	84
11.30 „	104	„	—	92
Mar. 22—				
12.30 a.m.	104·4	„	—	94
1.30 „	105	„	—	102
2.30 „	105·4	„	—	100
3 „	105	„	—	104
4 „	105·3	„		
5 „	105·8	„	—	104
5.45 „	106	Rec.		
			XXIII.	
5.46 „	—	—	95°	
5.49 „	106·1	Rec.	94	88
5.52 „	106	„	90	
5.55 „	105·7	„	89	
5.58 „	105·3	„	88	
6.1 „	104·6	„	86	
6.4 „	103·4	„	86	
6.5 „	—	„	86	
6.20 „	101·8	„	—	80
7.10 „	101·2	„	—	80
8.10 „	101·6	Ax.	—	88
9.30 „	102·4	„		
10.30 „	103	„		
11.30 „	103·5	„	—	92
12.30 p.m.	104·2	„	—	96
1 „	104·5	„	—	98
2 „	104·8	„	—	98
3 „	105·2	„		
4 „	104·8	„	—	98
5 „	104·3	„	—	100
6.45 „	103·4	„	—	100
7.45 „	103	„		
8.45 „	103	„		
9.45 „	103	„	—	90
10.45 „	102·8	„		
11.45 „	103·6	„	—	92
Mar. 23—				
12.45 a.m.	104·4	„		
1.45 „	104·8	„	—	92
2.45 „	105·8	„	—	100
3 „	106·2	„		
3.9 „	106·2	Rec.		
			XXIV.	
3.10 „	—	„	95°	
3.13 „	106·4	„	95	
3.16 a.m.	106·2	Rec.	92	90
3.19 „	106	„	90	
3.22 „	105·6	„	88	88
3.25 „	105·1	„	86	
3.28 „	104·7	„	86	82
3.31 „	104·2	„	86	
3.34 „	103	„	86	
4 „	100·6	„		
5 „	101	Ax.		
6 „	101·5	„	—	80
7 „	102	„		
8 „	102·8	„	—	90
9 „	103·4	„		
10 „	104·4	„	—	98
11 „	104·5	„		
11.30 „	104·8	„		
12.25 p.m.	104	„		
1.25 „	103·4	„	—	88
2.25 „	103·4	„		
3.25 „	103·6	„		
4.25 „	104·3	„		
5.30 „	104·1	„	—	90
6.30 „	103·6	„		
7.30 „	103·5	„	—	88
9.15 „	103·2	„		
10.15 „	103·4	„	—	90
11.15 „	104·2	„		
Mar. 24—				
12.15 a.m.	104·8	„		
1.30 „	105	„	—	100
2.30 „	105·6	„		
3.35 „	106	Rec.	—	108
			XXV.	
3.37 „	—	—	96°	
3.40 „	106·2	Rec.	95	98
3.43 „	106·2	„	92	
3.46 „	105·8	„	90	
3.49 „	105·7	„	88	86
3.52 „	105·2	„	86	
3.55 „	104·8	„	86	
3.58 „	104·2	„	85	
4.1 „	103·8	„	84	
5 „	100·4	Ax.	—	76
6 „	101	„		
7 „	101·2	„		
8 „	102	„	—	84

Date.	Temp.	Rectum or axilla.	Bath.	Pulse.
9 a.m.	102·4	Ax.	—	88
10 „	102·8	„		
1.30 p.m.	103·2	„	—	88
3 „	103·8	„	—	92
4 „	104	„	—	92
5 „	104	„		
6 „	103·4	„	—	88
7 „	102·8	„	—	84
8 „	102·8	„	—	84
9 „	102·6	„	—	80
11 „	102·6	„		
12 „	102·8	„		
Mar. 25—				
2 a.m.	103	„		
3 „	104	„		
4 „	104·6	„	—	92
5 „	105·2	„	—	94
6 „	105·4	„		
7 „	106·2	„		
7.25 „	106·6	Rec.		
			XXVI.	
7.26 „	—	—	97°	
7.29 „	106·9	Rec.	95	
7.32 „	106·5	„	91	100
7.35 „	106·4	„	88	
7.38 „	105·9	„	86	92
7.41 „	105·4	„	85	
7.44 „	104·7	„	85	86
7.47 „	103·9	„	85	
7.50 „	103·4	„	85	
8.30 „	100·6	„		
9 „	99·8	Ax.		
11.30 „	101·8	„	—	80
12.30 p.m.	102·4	„	—	92
2.20 „	104·8	„	—	98
3.10 „	104·3	„	—	98
3.40 „	104·6	„	—	100
5.30 „	104·5	„		
6.30 „	103	„		
8 „	102·8	„	—	90
9 „	102·6	„	—	94
10 „	102·4	„	—	84
11 „	102·5	„	—	80
12 „	103·4	„	—	90
Mar. 26—				
2 a.m.	103·5	„	—	90
4 „	104	„		
6 a.m.	104·6	Ax.		
8 „	104	„	—	84
10 „	103·5	„		
12 „	102·8	„		
2 p.m.	102·8	„		
4 „	102·5	„	—	86
6 „	101·2	„		
8 „	101	„	—	80
10 „	101·6	„	—	78
12 „	102·1	„	—	82
Mar. 27—				
2 a.m.	103	„	—	90
4 „	104	„		
6 „	104·5	„	—	92
7 „	105	„	—	96
8 „	104·2	„		
10 „	104·6	„		
12 „	104·2	„	—	92
2 p.m.	103·4	„		
4 „	103	„		
6 „	101·7	„		
8 „	101·4	„		
10 „	102	„		
12 „	103·2	„		
Mar. 28—				
2 a.m.	103·5	„		
4 „	104	„		
6 „	103·4	„		
8 „	103·6	„		
10 „	102·8	„	—	84
12 „	102·8	„		
2 „	103	„		
4 „	101·7	„		
6 „	102	„		
8 „	102·2	„		
10 „	102·4	„		
12 „	103·6	„	—	92
Mar. 29—				
2 a.m.	103·1	„	—	88
4 „	103·4	,		
6 „	104·4	„		
8 „	103	„		
10 „	103	„	—	92
12 „	103	„	—	90
2 p.m.	102	„		
4 „	101·8	„	—	90
6 „	102·7	„	—	84
8 „	102·8	„		

Date.	Temp.	Rectum or axilla.	Bath.	Pulse.
10 p.m.	102·8	Ax.	—	90
12 „	102	„		
Mar. 30—				
2 a.m.	102·6	„	—	92
4 „	103	„		
6 „	103·6	„		
8 „	103·6	„		
10 „	103·8	„	—	90
12 „	103·4	„	—	90
2 p.m.	103·4	„		
4 „	102·2	„	—	86
6 „	102·2	„		
8 „	103	„	—	90
10 „	103	„	—	92
12 „	102·2	„		
Mar. 31—				
3 a.m.	103	„	—	92
6 „	103	„		
9 „	103·2	„	—	90
12 „	103·4	„	—	92
3 p.m.	103	„		
6 „	102·4	„		
9 „	103	„		
12 „	103	„		
April 1*—				
7.30 a.m.	104	„	—	92
2 p.m.	102·4	„		
April 2—				
6 a.m.	103	„	—	94
11 p.m.	101·8	„		
April 3—				
12 a.m.	103·2	„	—	84
12 p.m.	102·2	„		

* Highest and lowest temperatures during the day.

Date.	Temp.	Rectum or axilla.	Bath.	Pulse.
April 4—				
5 a.m.	103·2	Ax.	—	100
1 p.m.	100·8	„		
April 5—				
3 a.m.	103·2	„	—	94
11 p.m.	100·6	„		
April 6—				
11 a.m.	100·6	„	—	98
12 p.m.	102·2	„		
April 7—				
M.	101·2	„	—	110
E.	100·8	„	—	100
April 8—				
M.	100·4	„	—	94
E.	102	„	—	130
April 9—				
M.	101·6	„	—	116
E.	101·2	„	—	102
April 10—				
M.	100·8	„	—	96
E.	100·8	„	—	100
April 11—				
M.	99·4	„	—	92
E.	101·2	„	—	106
April 12—				
M.	99·6	„	—	88
E.	99·2	„	—	92
April 13—				
M.	99·2	„	—	94
E.	99·8	„	—	88
April 14—				
M.	98·6	„	—	88
E.	98·8	„	—	88
April 15—				
M.	98·4	„	—	88

The FOURTH CASE was one in which the hyperpyrexia was due to a state of blood-poisoning, consequent on a surgical operation.

The patient, Michael Neary, æt. 44, was first seen July 6th, 1875. He was suffering from necrosis of the metatarsal bone of the great toe of the right foot; in all other respects his health was good. The toe trouble had been coming on since the previous Christmas. It began with pain and swelling, which resulted in a continuous discharge from the under side of the ball of the great toe. His health had always been excellent. He was married, and had seven healthy children.

For some time the toe was left at rest and simply poulticed; but on August the

17th, bare bone having been distinctly felt with a probe, Mr. Harrison cut down on it and removed the diseased portion of the metatarsal bone. He progressed very well, and the wound soon healed up, with the exception of a small sinus. In course of time, however, a further sequestrum was detected through this sinus, which led to a second operation on Tuesday, October 19th. At the close of the operation there was some general oozing, which was controlled by a tight bandage over a pad of lint. In the evening he was very comfortable.

20th.—Progressing very favourably; wound washed with carbolic lotion, and dressed with lint soaked in carbolic oil, and covered with lac plaster.

21st.—Apparently doing very well in the morning, when the wound was dressed; but, about eight o'clock in the evening, he was attacked with pain in the legs and head. In the course of the night the pain became intensely severe. He had had some rheumatic pains or cramp in his legs before, after work, but never anything like this. At the same time an insatiable thirst came on, and he felt thoroughly ill.

22nd.—Patient was quite unable to sleep last night, and this morning complained of feeling very cold, so the nurse covered him with fresh warm blankets. He does not remember to have shivered, nor was a rigor noticed by the nurse. It was about noon when attention was called to his condition, and a glance at his face showed how serious that was. He was pale, with a little lividity about the lips, a vacant restless motion of the eyes, and a peculiar hurried respiration. When spoken to he muttered something unintelligible in reply, without appearing to have any idea of either question or answer. The skin felt hot. Was supposed to be about 104°, but upon placing a thermometer in his axilla it was found to register 109°. He was becoming more insensible, and the respiration more excited, even during the last few minutes. The pulse could not be counted at the wrist. Evidently, if any remedy were to be tried, it must be tried at once. There was a bath-room at hand, so without any loss of time he was carried there. It was now noticed that perspiration was breaking out on his forehead. He was placed in the bath with the water at a temperature of 95°, the patient's temperature being at the time 109°, and his pulse (counted from the heart) 156 beats in the minute. The heart itself was acting violently. He was kept in this bath fifty minutes, during which time the temperature of the bath was gradually lowered to 74°, while the patient's temperature fell to 103·9°, and his pulse to 130. The respiration remained very rapid and violent, about 80 in the minute. Violent purgation took place in the bath. It was intended at first only to lower the bath to 85°, but the temperature came down so exceedingly slowly while the water was warm (as may be seen by referring to the list of temperatures at the end of the case) that it was thought best to continue the reduction for another 10 degrees. While in the bath he was quite unconscious, and in a measure delirious, struggling and sometimes talking, the respiration all the time maintaining its rapid noisy character. He was lifted from the bath on to a stretcher covered with blankets and a sheet, the latter being used to dry him; he was wrapped up in the blankets, and carried at once to bed. There was now a good deal of muscular rigidity, and a violent spasmodic sort of shivering about the upper extremities. He was sensible enough to object to the introduction of the thermometer into his rectum, a thing he would not have thought of doing if "in his senses." But he paid no attention to questions. His lips were blue, and the rapid, irregular, and forced character of the respiration was unabated. It counted exactly 80 in the minute. Altogether he seemed to have received no benefit from the bath, and it was feared that some change had taken place in connection with the cerebral tissue, which remained unaltered by the reduction of temperature. It was expected that the case would shortly prove fatal. He was removed from the bath at 1.20 p.m. At 1.30 the rectal temperature was 102·8°. Pulse 134. Brandy, half an ounce, was given. At 1.40 temp. 102·2°; pulse 129; resp. quiet, 34; muscles relaxed. At 1.50 temp. 102·2°; pulse 134. Beef tea two ounces. At 1.55 vomited. 2 p.m.—Respiration violent as before, over 80. Muscular rigidity returned. 2.15—Temp. 102.8°; pulse 128. 2.45—Respiration again natural, 30; no shivering. 3.15—Began to show signs of returning consciousness, and to sweat, so he was left quite undisturbed, and was probably asleep for a short time. At 4 sweating most profusely, with flushed face and full pulse. Since the bath the temperature had been taken in the rectum; it was now in the axilla 102·2°. Pulse 120; resp. 28. He was now quite sensible. Had not the faintest recollection of what had occurred to him since the feeling of chilliness in the morning and nurse putting some more blankets on him, and then the next patient saying it wanted ten minutes to twelve. When asked if he had had a bath to-day he treated it as an ordinary question, and answered, "No, sir, I have not had one since Tuesday morning, before I was operated on." He was now thoroughly comfortable, and able to take a little nourishment.

5 p.m.—Still in the most profuse perspiration, far in excess of anything that is ordinarily seen in acute rheumatism; so much, indeed, that when the blanket was raised from him a cloud of vapour ascended into the ward, and still very flushed. At the same time the temperature was falling, it being now 101·7°, the pulse 120, and the respiration 28. The tendency to vomit having completely disappeared, the diet was arranged so that something should be given every quarter of an hour, in the following order:—Brandy ʒiij, soup ℥j, port wine ℥ss, and beef tea ℥j; in addition, milk and effervescing lime water being allowed.

6 p.m.—Sweating profusely. Temp. 101·6°; pulse 118; resp. quiet. It was at this time that he first described the course of his illness coming on last night, being now in as complete command of his mental powers as ever he was, and stating distinctly that he remembered nothing after hearing the patient next him say that the time was ten minutes to twelve.

7 p.m.—Sweating profusely. Temp. 100·8°; pulse 116; resp. 28. Passed ten ounces of urine, amber colour; sp. gr. 1012; no sugar, but just a cloud of albumen. The reaction to test paper was acid.

8 p.m.—Temp. 100·6°; pulse 106; resp. 28. The sweating is less profuse, but the flushed character of his face still remains. 9 p.m.—Temp. 99·6°; pulse 112. 10 p.m.—Temp. 99·2°. 11 p.m.—Temp. 99·2°. 12 p.m.—Temp. 99·5; chloral hydrate grs. xxv.

23rd.—The patient was quite quiet and comfortable through the night, though unable to sleep. Took nourishment well, and the temperature kept below 100° until 9 a.m., when it was 100·2°. The sweating gradually ceased during the night, but his skin remained moist until about 8 o'clock in the morning, and as it became dry a headache set in. The skin remained dry until 4 p.m., when the temperature was 103° and the pulse 116. No rigor was noticed, and the respiration was quite quiet. At 5 sweating commenced again, but not so profusely as before; temperature still 103°. 6.—Temp. 103·2°. 8.—Temp. 102·6°; pulse 108. 10.—Temp. 102·6°. 12.—Temp. 102°; skin dry. Chloral draught repeated.

During the last twenty-four hours he had passed twenty-eight ounces of urine having the following character. Rather high coloured, with a peculiar odour and a somewhat ropy pus-like deposit; sp. gr. 1030; strongly alkaline; no sugar; a cloud of albumen, varying in different specimens. There was excessive effervescence with nitric acid, apparently even to one sixth part of the strong acid. The gas evolved precipitated chalk from lime water, and the urine, when warmed with Liquor Potassæ, gave off a gas, alkaline to test paper, and having a powerful smell of ammonia. An attempt was made to estimate the undecomposed urea, but the examination was conducted by gas light, so that the quantity was not exactly determined, though apparently high; and it was found that, to get rid of the carbonates, three volumes of the standard baryta solution was required to one of urine, two and a half volumes of the former not being sufficient. Chlorides seemed to be deficient, for the thick white precipitate following the addition of nitrate of silver to the urine was almost entirely redissolved by nitric acid. The deposit was not at all soluble by heat, though a good deal of it disappeared upon adding nitric acid, with considerable effervescence. Under the microscope it was seen to consist almost entirely of granular matter, with a few triple phosphate crystals and immense quantities of specially large moving bacteria, single, double, and in chains.

No motion had been passed since the purging in the bath on the 22nd.

24th.—During the first hour of the day the patient was attacked with a very severe rigor, lasting sixteen minutes, accompanied by nausea and purging. At 1 a.m. temp. 108·8°. At 2 beginning to sweat, and feels better; temp. 104·8°; pulse 134; purging, but no nausea. 3.—Temp. 105°; pulse 126; resp. 24. 4.—Temp. 104·8°. 5.—Temp. 105°; restless, but sweating. 6.—Temp. 103°; sweating profusely. 7.—Temp. 102°; sleeping quietly. 12.—Temp. 100°; pulse 108. The rest of the day passed off comfortably. There was a little elevation in the afternoon (102·8°), but no further tendency to rise. During the day he passed twenty ounces of urine; of this twelve ounces was passed before 7 a.m., and was of the same character as yesterday. The remaining eight ounces were of a somewhat lower specific gravity (1025), having an acid reaction, and, of course, no effervescence with nitric acid. There was still albumen. The deposit, which was copious, now consisted of lithates, with a few crystals of uric acid.

25th.—The temperature, which was 102° at midnight, gradually fell towards morning, it being 99·6° at 7 a.m. He did not get much sleep, though gr. xxx of chloral hydrate was given the last thing at night. Through the day the temperature varied from 100° to 103°, the pulse keeping below 100. He was very comfortable till evening, when the temperature was highest, and he became restless, His bowels were not opened. Skin moist all day, sometimes sweating freely. Passed thirty-three ounces of urine, of which one sample only, that passed at 5 p.m. (two ounces), resembled the urine of the 23rd in all its characters. This occurrence is, undoubtedly, very strange, and it would be more satisfactory to suppose that the samples of urine had become mixed, were there any reasonable possibility of such a mistake occurring. All the other specimens of urine resembled that passed on the latter part of the 24th.

At midnight a quarter of a grain of morphia was injected subcutaneously.

26th.—The morphia was not very successful in procuring sleep. The restlessness of the evening passed off, and, though unable to sleep much, he was quiet and comfortable. The temperature kept about 103° through the night. Skin moist. During the morning he sweated freely, and the temperature fell to 100°, and in the afternoon was even lower than this. He slept a little in the morning, and felt comfortable. He continued to take nourishment every quarter of an hour as before. At 9 p.m., temp. 101°; morphia gr. ½ injected subcutaneously. 10. Temp. 101°; pulse 102; resp. 24. At a quarter to 11 he had a severe rigor for twelve minutes. 11.

Temp. 102·1°; pulse 128. 12. Temp. 105°. No purging. Bowels not opened all day. Skin dry. Urine, thirty-five ounces, same characters as yesterday.

27th.—At 1 a.m. bathed at a temperature of 106·8°, for it was not deemed safe to wait any longer with such a rapid rise, nearly six degrees in two hours and a quarter, for there is no reason to suppose that the rise began before the rigor at 10.45. The bath was prepared at 95° and cooled to 80° in forty minutes, during which time the patient's temperature fell from 106·8° to 103·7°, and the pulse from 132 to 120. The fall after the bath was slow: thus, in ten minutes, temp. 103·4°, pulse 116; thirty minutes, temp. 102·5°, pulse 108; fifty minutes, temp 101·6°, pulse 104; one hour and a half, temp. 101·5°, pulse 98; two hours, temp. 101°. This was the lowest point. These temperatures were taken in the rectum; in the axilla it was just a degree lower, as was usually noticed in this case. From 3.30 to 5 a.m. he slept at intervals, and during this time the rise commenced. At the latter hour the temperature was 102·2°, and he began to sweat. From 5 till noon the temperature went down to 99°, and during the first few hours of the time (from about 5 till 9) he sweated, if anything, more profusely than ever. The temperature kept down through the day, but rose a little in the evening, 103·6° being the highest; this was, however, reduced by a free perspiration. At 10 p.m. morphia gr. ¼ was injected subcutaneously. The bowels were not opened all day. He passed thirty ounces of urine of sp. gr. varying from 1015 to 1025. All specimens acid, and containing albumen, but more in some than in others. Most had a deposit of lithates.

28th.—Passed a pretty comfortable day, with a moist skin and low temperature (99° to 101·6°); pulse 88. Quinine ordered in gr. v doses every four hours. He was a little disturbed with a short dry cough. Bowels not moved. Passed thirty ounces of urine of the same character as yesterday. Neither the morphia nor chloral seemed to have been any particular good, so they were given up. The brandy was increased to ℥xij in the twenty-four hours, the ℥xij of port being still continued.

The remainder of the case can be conveniently followed by referring to the subjoined list of temperatures:

The Temperature Chart of Case 4.

Time.	Temp.	Rectum or axilla.	Pulse.	Resp.	Remarks.
Oct. 22—					1st Bath, 50 minutes.
12.30 a.m.	109	Rect.	156	—	Bath 95°
12.35 „	108·8	„	—	—	„ 93
12.40 „	108·7	„	—	—	„ 90
12.45 „	108·2	„	156	—	„ 85
12.50 „	107·2	„	—	—	„ 81 … Violent purging.
12.55 „	106·9	„	156	Violent…	„ 80
1 p.m.	106·4	„	—	About 80	„ 77
1.5 „	106·1	„	150	„	„ 76
1.10 „	105·1	„	—	„	„ 74
1.15 „	104·7	„	136	„	„ 74

Time.	Temp.	Rectum or axilla.	Pulse.	Resp.	Remarks.
1.20 p.m.	103·9	Rec.	130	„	Bath 74
					REMOVED FROM BATH.
1.30 „	102·8	„	134	„	Muscular rigidity and shivering.
1.40 „	102·2	„	129	34	Respiration quiet.
1.50 „	102·2	„	134		
2 „	—	—	—	80	Vomiting; violent respiration.
2.15 „	102·8	Rect.	128		
2.45 „	—	—	—	30	Resp. quiet; no shivering.
4 „	102·2	Ax.	120	28	Sensible; sweating profusely; face flushed.
5 „	101·7	„	120	28	Sweating profusely.
6 „	101·6	„	118	—	Do.
7 „	100·8	„	116	—	Do. urine 10 oz.
8 „	100·6	„	116	28	Sweating less.
9 „	99·6	„	112		
10 „	99·2	„	—	—	Chloral hydrat., gr. xxv.
11 „	99·2	„	—	—	Sweating.
12 „	99·5	„			
Oct. 23—					
1 a.m.	99·4	„	—	—	Urine 4 oz.
2 „	99·2	„	—	—	Skin moist.
3 „	99	„			
4 „	99·4	„			
5 „	98·6	„	—	—	Urine 4 oz.
6 „	99	„			
7 „	99·6	„			
8 „	99·6	„	—	—	Urine 4 oz.
9 „	100·4	„	—	—	Skin becoming dry.
10 „	100	„	—	—	
11 „	100·4	„	—	—	
12 „	100·8	„	—	—	
1 p.m.	100·8	„			
2 „	101·4	„	—	—	Urine 8 oz.
3 „	101·6	„			
4 „	103	„	116	—	Skin dry.
5 „	103	„	—	—	Beginning to sweat.
6 „	103·2	„	—	—	Sweating.
7 „	103·2	„	—	—	Do. urine 4 oz.
8 „	102·6	„	118	—	Do.
9 „	102·6	„			
10 „	102·6	„	—	—	Urine 8 oz.; chloral hydrat., gr. xxv.
11 „	102·2	„	—	—	Bowels not acted since bath.
12 „	102	„			
Oct. 24—					
1 a.m.	103·8	„	—	—	Had rigor 16 minutes; nausea, purging; skin dry; urine 4 oz.

Time.		Temp.	Rectum or axilla.	Pulse.	Resp.	Remarks.
2	a.m.	104·8	Ax.	134	—	Purging; skin moist.
3	„	105	„	126	24	Comfortable.
4	„	104·8	„			
5	„	105	„	—	—	Sweating; restless.
6	„	103	„			
7	„	102	„	—	—	Sleeping.
8	„	103·2	„	—	—	Sweating; urine 8 oz.
9	„	102·4	„	—	—	Sweating.
10	„	101·6	„			
11	„	101	„	103		
12	„	100	„			
1	p.m.	100	„	—	—	Urine 4 oz.
2	„	101	„			
3	„	101	„			
4	„	102	„	—	—	Skin moist.
5	„	101	„	—	—	Urine 4 oz.
6	„	102·8	„	112	—	Slept 45 minutes.
7	„	102·8	„			
8	„	102	„			
9	„	101	„	—	—	Chloral hydrat., gr. xxx.
10	„	102	„	—	—	Slept 15 minutes.
11	„	102	„	—	—	Skin moist.
12	„	102	„	—	—	Slept 45 minutes.
Oct. 25—						
1	a.m.	102	„	—	—	Slept 40 minutes; skin moist.
2	„	101·6	„	—	—	Sweating.
3	„	101·6	„	—	—	Urine 9 ounces.
4	„	102	„	—	—	Slept 20 minutes.
5	„	101·6	„			
6	„	101	„			
7	„	99·6	„			
8	„	100·6	„	—	—	Urine 6 oz.
9	„	99·8	„			
10	„	101	„			
11	„	100·6	„			
12	„	101·4	„	84		
1	p.m.	102	„			
2	„	102·2	„	—	—	Urine 8 oz.
3	„	102·2	„	—	—	Skin moist.
4	„	102·4	„			
5	„	101·4	„	—	—	Urine 2 oz.
6	„	101	„	—	—	Skin moist.
7	„	101	„			
8	„	101·6	„	—	—	Urine 4 oz.
9	„	101	„	—	—	Slept 30 minutes.
11	„	103	„	—	—	Restless.
12	„	102	„	—	—	Urine 4 oz.; morphia injection (gr. ¼); bowels not acted.

Time.	Temp.	Rectum or axilla.	Pulse.	Resp.	Remarks.
Oct. 26—					
1 a.m.	102·6	Ax.	—	—	Skin moist.
2 „	103	„	—	—	Quiet, but unable to sleep.
3 „	102·6	„			
4 „	103	„			
5 „	103	„	—	—	Slept 20 minutes.
6 „	103	„	—	—	Urine 12 oz.
7 „	102·4	„	—	—	Comfortable, but cannot sleep.
8 „	102·6	„			
9 „	101·8	„	—	—	Skin moist.
10 „	101·2	„			
11 „	100·2	„			
12 „	100·8	„	—	—	Sweating; urine 8 oz.
1 p.m.	101	„			
2 „	100	„			
3 „	100·4	„	—	—	Slept 30 minutes.
4 „	101	„			
5 „	100	„			
6 „	100	„	—	—	Urine 10 oz.
7 „	99·6	„			
8 „	99·6	„			
9 „	101	„	—	—	Bowels not acted to-day.
10 „	101	„	102	24	Morphia, gr. ¼, subcutaneously.
11 „	102·1	„	128	—	Has had a rigor for 12 minutes.
11.30 „	105	„	124	—	Skin dry.
12 „	106	„			
Oct. 27—					
12.30 a.m.	105·8	„	122		
12.45 „	106	„			
					2ND BATH, 40 minutes.
12.57 „	106	„	—	Quiet Under	Bath 95°
1.2 „	106·8	Rect.	132	30	„ 93
1.7 „	106·2	„	—	„	„ 89
1.12 „	105·7	„	120	„	„ 85
1.17 „	105·3	„	—	„	„ 83
1.22 „	104·8	„	120	„	„ 82
1.27 „	104·5	„	—	„	„ 81
1.32 „	104·2	„	120	„	„ 80
1.37 „	103·7	„	120	„	„ 80
					REMOVED FROM BATH.
1.47 „	103·4	„	116		No shivering.
2.7 „	102·5	„	108		In axilla 100·8°
2.27 „	101·6	„	104		„ 100·6
2.47 „	101·5	„	101		„ 100·5

Time.	Temp.	Rectum or axilla.	Pulse.	Remarks.
3.7 a.m.	101·5°	Rect.	98	Bath 100·5°.
3.30 „	101	Ax.	—	Slept 16 minutes.
4 „	101·4	„	—	„ 40 minutes.
5 „	102·2	„	—	„ 20 minutes.
6 „	102	„	—	Skin moist; urine 10 oz.
7 „	101·4	„	—	Sweating freely.
8 „	101·4	„	—	Bowels not acted.
9 „	101	„	—	Sweating freely.
10 „	100·2	„		
11 „	99·6	„	—	Urine 4 oz.
12 „	99·4	„		
1 p.m.	99	„		
2 „	99	„		
3 „	99	„	—	Slept 15 minutes.
4 „	100	„		
5 „	101	„		
6 „	101	„	—	Urine 10 oz.
7 „	102·2	„	—	Skin moist.
8 „	101·6	„		
9 „	103·6	„	—	Skin dry; urine 6 oz.
10 „	103	„	—	Skin moist; morphia, gr. ¼, subcutaneously.
11 „	102	„	—	Slept 15 minutes; sweating.
12 „	102	„	—	Slept 20 minutes; bowels not acted to-day.
Oct. 28—				
1 a.m.	101·6	„	—	Cough; sweating.
2 „	101·2	„	—	Slept 25 minutes.
3 „	101·2	„	—	Cough troublesome.
4 „	101	„	—	Urine 6 oz.
5 „	101·4	„	—	Sweating.
6 „	101	„		
7 „	100	„	—	Sleeping quietly.
8 „	100	„	—	Skin moist.
9 „	100	„	—	Urine 8 oz.
10 „	99·6	„		
11 „	99·4	„	88	
12 „	100	„	—	Cough.
1 p.m.	100	„		
2 „	99	„		
3 „	99·6	„	—	Urine 8 oz.
4 „	100	„	—	Skin moist.
5 „	99	„		
6 „	100	„		
7 „	100·6	„		
8 „	100·6	„	—	Urine 8 oz.; quinine, gr. v.
9 „	101	„	—	Skin moist.
10 „	101·2	„	94	

Time.		Temp.	Rectum or axilla.	Pulse.	Remarks.
11	p.m.	101·6°	Ax.	—	Slept 25 minutes; sweating.
12	"	100	"	—	Slept 40 minutes; quinine, gr. v; bowels not acted to-day; brandy and port wine, each ℥xij.
Oct. 29—					
1	a.m.	101	"	—	Slept 20 minutes.
2	"	101	"	—	Urine 8 oz.
3	"	101·2	"	—	Sleeping.
4	"	101·3	"	—	Sweating freely; quinine, gr. v.
5	"	100	"	—	Dry cough.
6	"	101	"	—	Sweating freely.
7	"	99·4	"		
8	"	99·4	"	—	Urine 8 oz.; quinine, gr. v.
9	"	99·6	"	—	Small superficial abscess on inner side of ankle opened.
10	"	100·2	"		
11	"	100	"		
12	"	100	"	92	Quinine, gr. v.
1	p.m.	100	"		
2	"	99·6	"	—	Urine 8 oz.
3	"	99·4	"		
4	"	99·6	"	—	Urine 6 oz.; quinine, gr. v.
5	"	99·5	"		
6	"	99·4	"		
7	"	99·4	"		
8	"	100	"	—	Urine 8 oz.; quinine, gr. v.
9	"	100	"	94	
10	"	100·4	"	—	Sweating freely.
11	"	101·4	"		
12	"	101	"	—	Urine 4 oz.; quinine, gr. v.
Oct. 30—					
2	a.m.	101	"	—	Sleeping at intervals.
4	"	101·2	"	—	Quinine, gr. v.
6	"	100	"	—	Skin moist.
8	"	99·2	"	—	Urine 6 oz.; quinine, gr. v.
10	"	99·8	"		
12	"	100	"	—	Quinine, gr. v.
2	p.m.	100·4	"		
4	"	100	"	—	Quinine, gr. v.
6	"	100·2	"		
8	"	99·2	"	—	Urine 4 oz.; quinine, gr. v.
10	"	100	"	—	Sleeping; sweating.
12	"	101	"	—	Cough troublesome. Quinine, gr. v. Bowels not acted to-day.
Oct. 31—					
2	a.m.	101·2	"	—	Sleeping.
4	"	100·8	"	—	Urine 7 oz.; quinine, gr. v.
6	"	100	"		
8	"	99·6	"	—	Quinine, gr. v; has had a comfortable night.

Time.	Temp.	Rectum or axilla.	Pulse	Remarks.
10 a.m.	98·8°	Ax.	—	Urine 4 oz.
12 „	100	„	—	Quinine, gr. v.
2 p.m.	101	„	—	Cough, with tenacious mucous expectoration.
4 „	100·4	„	—	Quinine, gr. v.
6 „	100	„	—	Urine 6 oz.
8 „	100	„	—	Urine 4 oz.; quinine, gr. v.
10 „	101·2	„	96	
12 „	100	„	—	Sleeping; quinine, gr. v; bowels not acted.
Nov. 1—				
4 a.m.	98·4	„	—	Quinine, gr. v.
8 „	100	„	—	Do. comfortable night.
12 „	100·2	„	—	Do.
4 p.m.	100·2	„	—	Do. bowels acted.
8 „	99·6	„	96	Do.
12 „	101	„	—	Do. sleeping; urine 34 oz. albumen; traces of alcohol.
Nov. 2—				
4 a.m.	99	„	—	Quinine, gr. v.
8 „	99	„	—	Do. comfortable night.
12 „	100·4	„	92	Do.
4 p.m.	101·4	„	—	Do.
8 „	99·4	„	—	Do. sweating.
12 „	99·6	„	—	Do. urine 18 oz., albuminous bowels not acted; brandy ℥vj, port ℥ix.
Nov. 3—				
4 a.m.	99	„	—	Do.
8 „	99	„	—	Do. small superficial abscess over instep of right foot opened.
12 „	100·2	„	100	Quinine, gr. v.
4 p.m.	99·4	„	—	Do.
8 „	99	„	—	Do.
12 „	99·4	„	—	Do. sweating; urine 26 oz., albumen (not much); bowels not acted.
Nov. 4—				
4 a.m.	98·6	„	—	Quinine, gr. v.
8 „	97·8	„	—	Do. comfortable night.
12 „	98·2	„	98	Do.
4 p.m.	99	„	—	Do.
8 „	99·8	„	—	Do. sweating.
12 „	98·6	„	—	Do. urine 58 oz., albumen, trace of alcohol, sp. gr. 1012; bowels not acted.
Nov. 5—				
4 a.m.	99·6	„	—	Quinine, gr. v.
8 „	98	„	—	Do. comfortable night.

Time.	Temp.	Pulse.	Remarks.
Nov. 5—			
12 a.m.	97·4°	98	Quinine, gr. iij; chicken.
4 „	99·4	—	Quinine, gr. x; attack of vomiting and purging.
8 „	98	98	Sweated freely.
12 „	97	98	Quinine, gr. iij; urine 35 oz., albumen.
Nov. 6—			
4 a.m.	96	—	Quinine, gr. iij, every 4 hours; severe vomiting and purging during the middle of the day; fluid diet; brandy ℥ix, port wine ℥ix; urine, cloud of albumen, trace of alcohol.
8 „	96	—	
12 „	97	110	
4 p.m.	99	—	
8 „	97·2		
12 „	97·2	110	
Nov. 7—			
4 a.m.	97·6	—	Quinine, gr. iij every 4 hours; very severely purged all day, but scarcely any vomiting, urine, sp. gr. 1023, cloudy precipitates with acetic acid, redissolved by heat; cloud of albumen in other specimens, and in all traces of alcohol.
8 „	98	—	
12 „	98·2	89	
4 p.m.	98·2	—	
8 „	97·4	98	
12 „	97·6	—	
Nov. 8—			
4 a.m.	97	—	Quinine, gr. v, every 4 hours; dilute sulphuric acid and tinct. of opium, of each ♏x every 8 hours; severe vomiting and purging. Peculiar rash, consisting of vesicles on a purpuric base on right foot and ankle.
8 „	97·2	102	
4 p.m.	98·4	—	
8 „	98	—	
Nov. 9—			
4 a.m.	97·8	—	Quinine reduced to gr. iij; mixture three times a day; patient very comfortable through the night and until the afternoon, when the vomiting and purging returned; urine, albumen, trace of alcohol; the rash has increased.
8 „	97·8	96	
4 p.m.	97·6	100	
8 „	98	—	
Nov. 10—			
4 a.m.	97	—	Quinine, gr. ij, three times a day.
8 „	98	94	Very comfortable day.
4 p.m.	99	—	Brandy reduced to ℥vj.
8 „	99·6		
Nov. 11—			
4 a.m.	97·6	—	Severe attack of vomiting and purging in the middle of the day; urine, sp. gr. 1022, lithates, phosphates, albumen, and trace of alcohol.
8 „	98	98	
4 p.m.	98	—	
8 „	99		
Nov. 12—			
4 a.m.	98·2	—	No vomiting, no purging; rash scattered on both legs and arms, and also on both ears.
8 „	99·4	98	
4 p.m.	98·2		
8 „	98		
Nov. 13—			
4 a.m.	96·4	—	Severe vomiting and purging, particularly about

Time.	Temp.	Pulse.	Remarks.
8 a.m.	98°	100	noon; pulse very weak; urine, sp. gr. 1023, very faint; cloud of albumen yesterday and to-day; trace of alcohol; port reduced to ℥vj, brandy ℥iv.
4 p.m.	98·6	—	
8 „	97	—	
Nov. 14—			
4 a.m.	96·6	—	Very comfortable day.
8 „	97	104	
4 p.m.	97·6		
8 „	98·2		
Nov. 15—			
4 a.m.	98·2	—	Purging at noon.
8 „	98·2	98	
4 p.m.	98		
8 „	98·6		
Nov. 16—			
4 a.m.	98	—	Very comfortable day.
8 „	97·6		
4 p.m.	98		
8 „	98		
Nov. 17—			
4 a.m.	97	—	Purging at noon.
8 „	97·6	88	
4 p.m.	98		
8 „	98		
Nov. 18—			
4 a.m.	96·2	—	No vomiting nor purging; the larger patches of the rash are scabbing.
8 „	97·2	98	
4 p.m.	98·4		
8 „	98		
Nov. 19—			
4 a.m.	97·6	—	Purging, no vomiting, at noon.
8 „	97·2	94	
4 p.m.	98·4		
8 „	98·2		
Nov. 20—			
4 a.m.	98	—	Comfortable all day; sleeps much better at night now; incisions healed, and operation wound nearly well; urine, sp. gr. 1015, albumen.
8 „	97	92	
4 p.m.	99	—	
8 „	97·5	—	
Nov. 21—			
4 a.m.	97·6	98	Purged a little in the middle of the day; still a quantity of the rash on extremities.
8 „	98	—	
4 p.m.	98		
8 „	96·8		
Nov. 22—			
4 a.m.	95·6	—	Comfortable day; health improving.
8 „	97		
4 p.m.	98		
8 „	97		

Time.	Temp.	Pulse.	Remarks.
Nov. 23—			
4 a.m.	97°	—	Purged a little; foot quite healed; fish diet; still albuminuria.
8 „	97·2	88	
4 p.m.	98		
8 „	98		
Nov. 24—			
4 a.m.	98	—	No purging nor vomiting.
8 „	98	84	
4 p.m.	97		
8 „	97		
Nov. 25—			
4 a.m.	97	—	Chicken diet. Convalescent, but still albuminuria.
8 „	98	84	
4 p.m.	98·2		
8 „	98·2		

Rash disappeared about November 30th. First got up December 4th. Discharged cured December 24th, with the exception of the albuminuria.

Occurring in connection with the first three cases, and, indeed, altogether belonging to the group, was a case of rheumatic hyperpyrexia under the care of Dr. Wilks, which was bathed, and reported in the 'Guy's Hospital Gazette' by Mr. H. Williams, who at the time was house physician at Guy's Hospital. This is a case which, in justice to the bath treatment, should be considered with the foregoing, and therefore, seeing that it might be difficult to refer to the sixteenth number of the fifth volume of the 'Gazette' in which it was published, I have thought it best to quote it from that journal.

"C. H—, æt. 19, was admitted into Stephen Ward under Dr. Wilks on October 7th, 1874. It was his second attack, and he had been ill ten days before admission. His temperature on the evening of admission was 101·8°; pulse 96; resp. 24. No cardiac complication. As he was suffering intense pain in most of his joints Dr. Wilks decided to blister them, and treat him without any internal remedies. The blisters gave great relief, and he continued to do well until October 11th, when his morning temperature rose to 104°. It continued at this height until the evening of the 14th, when it rose to 106°, with a pulse of 108. Tongue moist; no delirium nor tremor; sweating profusely, and pains severe. Ordered by the house physician tincture of aconite ♏x every three hours.

"Next morning (October 15th), temperature 104·6°; and in the evening 108·8°.

"Oct. 16th.—Temperature, morning, 104·6°; evening, 105°. Systolic aortic bruit noticed to-day for the first time. No pericardial sound. Somewhat delirious, and very tremulous. Tongue moist.

"17th.—Four motions during the night, cannot control them. Temperature 11 a.m., 105·6°; pulse 116; resp. 40. 4 p.m. Temp. 106·6°; pulse 128; resp. 36.

6.45 p.m. Temp. 109·6°; pulse 160. Very delirious; muttering; skin dry; pupils widely dilated; seems to be dying fast. Placed in a bath with water at temperature of about 80° to begin with, and cooled to 66°. After being one hour in the water his temperature taken in the mouth was 100·2°; pulse 95. During this hour he slowly became conscious, and at last quite rational, and said he enjoyed being in the water On being taken from the bath he was wrapped between blankets, without being dried. At 8 p.m. (a quarter of an hour after being put to bed) his temperature was 97·2°; pulse 88, As he seemed in some danger now of going off in the other direction, hot bottles were put to his feet and hot beef tea and brandy given. 10.30 p.m. Temp. 97·2°; pulse 100; patient inclined to sleep. Ice-bag applied to head.

"18th, 1 a.m.—Temp. 99°; pulse 106; patient fast asleep. He has taken one pint of beef tea. 5.30 a.m.—Temp. 103·8°; pulse 126. As his temperature had risen rapidly during the last hour he was again bathed; thirteen minutes in water at 74°. 5.35 a.m.—Temp. 100°; pulse 108. 10.30 a.m.—Temp. 102·5°; pulse 112. 12, noon.—Temp. 104°; pulse 120. 4 p.m.—Temp. 104·6°; pulse 112. Four loose motions since 5 a.m., very like typhoid stools in appearance; skin dry; no delirium; pain has returned in shoulder joints. 6 p.m.—Temp. 105; pulse 130; resp. 28. Bath at 72° for twenty minutes; temperature of bath was raised four degrees by patient's body. 6.30 p.m.—In bed; temp. 97·6°; pulse 100; resp. 20. 7 p.m.—Temp. 98·4°; pulse 100. 9.15 p.m.—Temp. 100·6°; pulse 112.

"19th, 12.30 a.m.—Temp. 102·5°; pulse 118. Has slept since 7 p.m.; talks much in his sleep. 9.30 a.m.—Has passed a very good night, sleeping most of the time He took his milk, beef tea, and brandy well during the intervals. This morning he is quite sensible dozing off to sleep every few minutes. Over front of chest there are sibili and rhonchi to be heard. At right base behind there is dulness on percussion, with bronchial whiffing breathing, and bronchophony, reaching as high as scapula. At left base there are moist sounds. Temp. 104·6°; urine neutral, rather offensive. Complains of pain in right wrist. Skin moist. Tongue coated with thick yellow fur. Diarrhœa continues very bad, as many as nine motions in twenty-four hours, passed into the bed. It is restrained for five or six hours by enema opii, which was ordered to be repeated whenever necessary. From this date the patient made a slow but uninterrupted recovery until his discharge from the hospital early in December. On dismissal his heart sounds were quite healthy."

I would rather for many reasons that these cases should stand as they are, simply a plain narrative of the facts as observed in connection with them; chiefly, because I have already intruded upon much more space than I had hoped to do, and yet perhaps equally because they are but counterparts of cases which have been so ably commented upon by the most renowned of our teachers. Yet it may be of some use to collect together a few of the points which appeared to those who watched the cases to be the most worthy of notice.

In the first place, do they help to establish that the natural course of hyperpyrexia is to be fatal, and that previous treatment has nothing whatever to do with its causation? There are but few, indeed, that would doubt the first clause. Those few could not have a better example than the second case. In my experience that is a most typical case of rheumatic hyperpyrexia. There was no suspicion of any untoward symptom until the sweating ceased, then the pains went completely away, soon delirium supervened followed by coma, which would without doubt have resulted in death in a few hours but for the bath. The second clause seems to me scarcely to merit a repudiation. Its introduction in opposition to the bath treatment, to my mind, exposes the weakness of that opposition. It is a suggestion purely without fact. The immense doses of quinine, the drenching with alcohol, the cold baths, have all followed and not preceded the dangerous symptoms in fatal cases, while the bath has been used in cases of acute rheumatism with lower temperatures, which have never afterwards shown a dangerous symptom. But, with the German experiences before us, it seems almost time that we ceased to regard bathing at high temperatures as a violent remedy.

Whether the action of the bath is thoroughly understood appears to be doubtful; for there would seem to be some reason to suppose that, the increase in temperature would not alone be sufficient to account for the conditions coincident with it. And one must allow that the wide range of the fatal point—from 107° to 112°—certainly supports this idea, while, if we have to extend that point to over 120°, the question is settled, and it remains for us to discover what lesion of the nervous system it is which is so beneficially treated by bathing the patient, and what else can be the immediate cause of the delirium, the coma, and death. To my mind we have not at present sufficient reason to seek for anything else. No matter what causes the rise in temperature, rheumatism, pyæmia, injury to the spinal cord, &c., in all the result is the same; and no matter how you reduce the temperature—by the bath, sponging, iced bags, or natural sweating,—in all the bad symptoms disappear; provided—which is a great point—a temperature has not been reached, which physiologists teach us would permanently affect the tissues. Such a temperature apparently was attained in the second case, a case most perfectly orthodox up till just the point before death; at that point we reduced the temperature, and he lived for several hours with no further rise. Now, if hyperpyrexia be only a comparatively harmless expression of some severe nervous lesion, which is removable by bathing the patient, how can we explain this case? for the hyperpyrexia is removed, while the lesion remains. If it be urged that the lesion was too far advanced to yield to the treatment, then the high temperature should have remained with it. I cannot but think that everything points to the fact that the bath acts upon the temperature alone, to which also the grave symptoms alone are due. For one can scarcely allow more than one cause for these symptoms. They all come and they all go together, as the temperature is high or low.

To decide exactly the fatal point is difficult. In many cases it certainly appears not much to have exceeded 107°. Yet one must always bear in mind that, as Dr. Wilson Fox has said, the extreme rise is often very rapid. So that the temperature may have taken a long time to get from 106° to 107°, but in an hour or two attain from this point to 110°; and the observer, having taken the temperature every two or three hours, is led to think that, from its slow progress, the temperature of 107°, which he took an hour or two before death, can scarcely have been exceeded by more than a point or two. I have a very strong impression that this has occurred in some cases I have heard of, and I am particularly anxious that death at these comparatively low temperatures should be explained, for my own experience leads me to the conclusion expressed by Dr. Wilson Fox that it is safe to wait until 107° has been reached before applying cold, though at the same time, on account of the rapidity of the extreme rise, it is usually advisable not to wait so long. At any rate in the greater number of cases the fatal point is considerably above 107°, and often above 111°.

Of course if 107° were maintained for some considerable period one can understand its being fatal, and it seems to be so rarely, if ever, attained in acute rheumatism, except as owing to this peculiar complication, that it is wisest in all cases to bath before

107° is reached, because, on the one hand, it may be fatal by a continuance, and, on the other, by a further rise. For experience shows us that one has very little right to expect an unaided recovery from a temperature of 107° in acute rheumatism, though in some other affections one may perhaps wait longer; for instance, I am not at all sure but that in the fourth case, of blood-poisoning after a surgical operation, the temperature of 109° might not have been recovered from without a bath. He was just beginning to sweat on the forehead, but, being unconscious, I dare not wait longer for this doubtful result.

Perhaps the point on which, during the experience of these cases, I felt the most in doubt, was, what temperature should one consider to be the most favourable at which to maintain the patient? Noticeably, Dr. Wilson Fox took a much lower standard in his cases than was adopted in the foregoing. And it appears to me that, to be able to decide this point, one must feel satisfied as to whether the continuance of a fairly high temperature is to be considered more injurious than a constant repetition of the bath, or an almost continuous application of ice bags. Of cases of hyperpyrexia we have not yet sufficient to decide positively this point. But we see that in Germany the ordinary ranges of pyrexia are very beneficially treated by frequently repeated baths, a fact which has also been substantiated by English experience; and this should certainly be enough to show that the frequent repetition of baths is at least not deleterious, while no one doubts that the continuous maintenance of a temperature of over 105° certainly is.

And, again, if it may be taken as evidence, Dr. Wilson Fox's long case was certainly not nearly so protracted as the two mentioned here, one of which ended in death. So that if a future opportunity occurred I should certainly be disposed to maintain a lower temperature. This might probably have been done but for the special circumstances of the cases. The first was an early experience; the second too short; the third happened to be a fellow student, with whom it was desirable to adopt as little unusual treatment as possible; while the fourth case was of a different type altogether, in which the temperature showed no tendency to remain high for more than a few hours at once.

Although almost without experience of the ice-bag or cold pack, I cannot help expressing a strong conviction that the tepid bath is the best measure to adopt. I do not know that it has ever acted injuriously in any way, but I do know that it is by far the most pleasant to the patient, and the most sure in attaining the desired object.

In the case copied from the 'Guy's Hospital Gazette' it will be noticed that hyperpyrexia was followed by copious diarrhœa, and Dr. Wilks was of opinion that this diarrhœa prevented any further rise of temperature, after the same manner as a profuse perspiration; and when one remembers that violent purging frequently takes place towards the extreme rise, the suggestion occurs that, artificially produced, this violent purgation might have a beneficial effect in reducing the temperature, and is perhaps worthy of a trial.

The frequency of the pulse, the rise of temperature during the first few minutes in the bath, its rate of reduction at different temperatures of the bath, the extent of reduction that may be practised, and a host of other interesting features press themselves forward for comment; and, enticing as it is to express an opinion upon all these points, still I am reminded that the bathing of these cases was entrusted to me as a house physician, and that my duty lies more in simply reporting the facts to the profession as they were observed than in commenting upon them, and therefore I refer those who are interested to the results recorded.

As the matter stands at present, the bath treatment is advocated upon two grounds: the first is that it saves life in hyperpyrexia; and the second that it is a valuable remedial agent in ordinary pyrexia.

On the second count it is deserving of the most careful consideration of the profession; but, on the first, it demands an unanimous adoption; and the man who would refuse to bath a patient dying from hyperpyrexia, until he can offer some other successful method, would be guilty of sacrificing his patient's life to a prejudice as narrow-minded as it is shallow.

TWO CASES OF OPERATIVE SURGERY.

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CASE 1.—*Operation for the Radical Cure of Hernia in a Child, by Mr. John Wood's Pin method; partial success.*

A boy, æt. 6, was brought to the Stanley Hospital in April, 1874, suffering from an inguinal hernia occupying the right scrotum. The tumour was about the size of a goose's egg, and went back easily when the boy lay down; the inguinal canal was wide enough to transmit a walnut, and its two apertures were dragged so nearly parallel to the axis of the body as to have erased any obliquity which the direction of the hernia may have possessed. The protrusion had existed since birth and was presumed to occupy a congenital sac. In addition to this defect the right forearm was unrepresented except by a conical stump projecting an inch or so below the elbow, the result, it is imagined, of intra-uterine mutilation. Only a single bone could be felt in this stump, which, however, most satisfactorily served his purpose as an instrument of self-defence and of aggression in his little encounters with his fellows.

On the 24th of April, 1874, under the influence of an anæsthetic, Mr. Wood's operation, with a view to a radical cure, was performed with the smaller rectangular pins devised by that gentleman, and in strict accordance with the directions so clearly given in his work on the subject. A pad of lint and spica bandage were then applied. In three days the testicle on the side of the hernia was swollen to about twice its former size. There was no pain, but slight tenderness at the part.

After five days the pins were removed, their track being by that time a freely suppurating sinus, and the scrotum very œdematous. A thick band of inflammatory consolidation could now be felt in the inguinal canal, and slight abdominal tenderness in the neighbourhood.

On the eighth day the abdominal tenderness was gone and the scrotum diminished in size.

On the twelfth day a ring-shaped pad was used.

On the twenty-second day all suppuration had ceased, the thickening in the canal was nearly gone, and when he stood up there was no hernia. The pad and spica were, of course, continued, and a truss was ordered for him.

On the fortieth day the pad was loose, and the hernia was once more in the scrotum. The young fellow had, in spite of some vigilance, got up and run about in the hospital.

Two days later a truss was put on, and this answered perfectly in preventing a further descent.

On the sixty-fourth day he was discharged, the truss having, since its application, successfully prevented the protrusion of any abdominal contents.

Four months later, or six months after operation, he called at the hospital, and his mother declared that the rupture had never reappeared. The inguinal apertures could scarcely be detected on examination. The continuance of the truss was advised for a year or two.

In this case the hernia was so large, and the inguinal apertures were so wide at the time of the patient's first visit, that the application of a truss was not regarded as likely to prove of any avail. The operation so far answered its purpose that it easily permitted an ordinary truss to keep the abdominal viscera within their proper cavity. Whether, if the hernia had not been permitted to reappear, the sac could have been absolutely obliterated, it is not easy to say; as the firm adhesion of the walls of a protruded peritoneal pouch has hitherto been difficult, because uncertain, of achievement; but the result, even if it shall never be a radical cure, is so far a satisfactory remedy that the comfort of the patient is secured, the utility of a truss is at any rate made practicable, and an ultimate cure by that means made possible.

CASE 2.—*Fracture of the Jaws; Wire Suture.*

A boy, æt. 12, was brought to the Stanley Hospital on September 4th, 1875, having, half an hour previously, fallen a depth of about six feet into a neighbouring sandstone quarry, some of the loose stones of which had crushed and injured his face. The left cheek was raw from general abrasion, and the lower lip split and ragged all over the red margin. The left upper jaw was obviously depressed, its front teeth and their alveolar margin driven in, and a perceptible difference of level between the hard palate of this and the right side.

The lower jaw was fractured at the first left bicuspid tooth, the break passing obliquely downwards and backwards, the inner margins of the fragments being exposed, rendering the fracture compound. The displacement here was considerable. There was, in addition, free bleeding from the right ear.

In about an hour later the lower jaw was drilled and wired. He was now much blanched, and his pulse very feeble and quick; the bleeding continued from the ear, but he was quite conscious and not in pain. Intense ecchymosis of the eyelids had now come on, greatly increasing the disfigurement. The bicuspid tooth at the seat of fracture was first withdrawn, as a precaution to ensure union. I then held the jaw with the left hand, and the handle of an Archimedean drill with the right, while the house-surgeon worked the drill. Two drill-holes were made, one in front of, and the other behind, the fracture, both being directed below the level of the inferior dental canal, so as to avoid wounding the nerve.

The front drilling was performed simply through the jaw after turning down the lower lip; but that of the posterior fragment, being behind the corner of the mouth, was performed by piercing the cheek from the outside, drilling the bone there, and passing the wire through bone and cheek; the wire was then picked up from inside the cheek by incising the mucous membrane under which it lay, the hole in the cheek being then done with and left to heal.

Each end of the wire was then twisted into a coil by means of the key devised by Mr. Hugh Owen Thomas, of Liverpool, which is simply a steel rod with a slit at the end, the coil in each case lying on the outside of the bone, but inside the lip and cheek. In returning the wire from the inside through the drill hole, a straight hollow needle was used; this being easily introduced from the outside, and taking the tip of the wire which is then withdrawn with the needle. When the wire was twisted up the apposition of the fragments was perfect, and the only subsequent reatment adopted was frequent washing and wiping of the mouth and injured parts.

No dressing or bandages of any description were used, and the depression of the upper jaw was disregarded. The bleeding from the ear ceased the same evening, and the boy never had any particular discomfort, and slept well each night afterwards.

On the following day the key was introduced into one of the coils of wire to tighten it up, and about a quarter of a turn given; after which the wire was not again interfered with until withdrawn.

He was kept in bed about a week, and fed on liquid diet for about a fortnight, by which time distinct union had taken place, as exhibited by an almost absence of tenderness on straining the fragments.

He lost three upper incisor teeth and the left canine, and their alveoli necrosed, during his convalescence. The left lower second milk molar was shed during this period, and the permanent bicuspid appeared in its place.

The wire was cut and withdrawn twenty-six days after being put in, consolidation being firm, and some periosteal callus having formed.

An abscess formed in the cheek at the seat of fracture, and left a sinus leading to bone; this, however, was healed completely in ten weeks.

His appearance more than three months after the accident is somewhat peculiar, as the injury to the upper jaw has imparted a curious vacant expression to his face, the lips, too, being a little apart. This is mainly due to the absence of his front teeth and their alveoli, the place of which has granulated up and cicatrised; the deformity due to the depressed maxilla alone being now but slight; when complete contraction of the cicatrix has taken place he will be able to have a plate and some artificial teeth, which will probably restore his natural expression. The lower jaw is in every respect satisfactory, strong, and without any deformity.

I must regard this treatment as the most simple and effectual yet devised; a great merit being that by its means the tolerably old method of drilling and wiring is rendered both effectual and workmanlike; while the superiority lies in the plan of twisting each end of the wire, separately, into a coil which can be tightened at will by the mere introduction of the key, and without disturbing the fragments, the wire, or the patient.

The operation was performed with the instruments described in

Mr. Thomas's pamphlet, from which my information on the subject has been derived, and where full explanation and illustration can be found.

The wire which I used was of annealed silver, $\frac{1}{32}$ inch thick; but in reality copper bell-wire of the same size would do admirably, and I should use it in future cases.

The two following conditions should be borne in mind:

1. The method is only required in compound fractures.
2. Any tooth at the seat of fracture should be at once removed, for want of which it has been ascertained that union has been interfered with.

STATISTICS OF MAJOR OPERATIONS PERFORMED AT THE MANCHESTER ROYAL INFIRMARY, FROM JUNE, 1874, TO JUNE, 1875.

COLLECTED BY T. JONES, ESQ., F.R.C.S.,
PATHOLOGIST TO THE HOSPITAL.

Lithotomy.

Sex.	Age.	Recovered.	Died.	Remarks.
M.	10	1		
M.	68	1		
M.	49	—	1	Lithotrised twice. Bronchitis after lithotomy cause of death.
M.	2	1	—	One triangular calculus removed from urethram.
M.	12	1		
M.	68	—	1	Enlargement of middle prostatic lobe forming a tumour, which projected into the bladder.
M.	14	1		

Total results.—7 operations; 5 recoveries; 2 deaths.

Ligature of Arteries.

Sex.	Age.	Vessel tied.	Cause of operation.	Result.
M.	38	Superficial femoral	Popliteal aneurism	Cured.
F.	38	Subclavian third part	Secondary hæmorrhage from an arm stump. Attempts to ligature vessel on face of stump unsuccessful.	Death.

Total results.—2 arteries tied; 1 successful; 1 death.

Ovariotomy.

Age.	Kind of tumour.	Operation.
39	Multilocular	January 25, 1875.

Herniotomy.

Age.	Sex.	Variety.	Period of strangulation.	Result.
57	F.	Femoral	—	Cured.
28	M.	Inguinal	48 hours	Death.
63	F.	Umbilical	—	Fæcal fistula.
45	F.	Inguinal	3 days	Death from peritonitis.
45	F.	Femoral	2 "	Death from gangrene of bowel.
28	M.	Inguinal	—	Cured.

Total results.—Number operated upon, 6; recoveries, 3; deaths, 3.

Excisions.

No.	Age.	Sex.	Joint.	Disease or injury.	Result.
1	16	M.	Elbow	—	Death (erysipelas-exhaustion).
2	63	M.	Knee	—	Subsequent amputation of thigh.
3	24	M.	Elbow	Ankylosis due to rheumatic arthritis	Useful arm.
4	15	F.	Ankle	Caries	Continuance of disease.
5	26	M.	Elbow	—	Useful arm.
6	21	F.	"	Ankylosis from old injury	"
7	10	M.	"	—	—
8	30	M.	Knee	Ankylosis after scarlet fever 26 years ago	Death; amyloid kidneys.

Total results.—8 excisions: knee 2, elbow 5, ankle 1. Two deaths and one subsequent amputation.

Removal of Breast.

Age.	Kind of tumour.	Operation.	Result.
42	Adenoma	Aug. 7, 1874	Healed.
44	Scirrhus	Sept. 5 "	"
52	"	Oct. 8 "	"
45	"	" 9 "	"
31	"	Nov. 6 "	"
*42	"	Feb. 26, 1875	Death.
35	" (recurrent)	April 9 "	Healed.
57	"	" 24 "	"
48	"	" 23 "	Return in cicatrix.
45	" (ulcerating)	June 16 "	Healed.
39	"	" 23 "	—

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* This case was remarkable on account of the length of time (26 years) a tumour had existed in the breast. After remaining quiescent for years it has grown very rapidly of late. On a post-mortem examination, secondary nodules were found in the liver and in the pleura, also in the fibro-cartilage between eighth and ninth dorsal vertebra.

Amputations.	Total.	Prim. for accident.		Second. for accident.		Second. for disease.		Primary for accident.																Secondary for accident.																Secondary for disease.															
								Recovered.								Died.								Recovered.								Died.								Recovered.								Died.							
								Sex.		Ages.						Sex.		Ages.						Sex.		Ages.						Sex.		Ages.						Sex.		Ages.						Sex.		Ages.					
										Under								Under								Under								Under								Under								Under					
		Recovered.	Died.	Recovered.	Died.	Recovered.	Died.	Male.	Female.	10	20	30	40	50	60 and over.	Male.	Female.	10	20	30	40	50	60 and over.	Male.	Female.	10	20	30	40	50	60 and over.	Male.	Female.	10	20	30	40	50	60 and over.	Male.	Female.	10	20	30	40	50	60 and over.	Male.	Female.	10	20	30	40	50	60 and over.
Forearm	9	6	...	...	1	2	...	6	...	...	2	1	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	2	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...
Arm	12	8	1	2	...	1	...	8	...	...	1	2	4	1	...	...	1	...	1	...	...	...	...	2	...	...	...	1	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Shoulder-joint	1	1	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Foot	6	1	...	...	...	5	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	2	1	2	2	...	...	...	...	...	...	...	...	...	...	...
Leg	15	4	1	3	2	4	1	4	...	...	...	3	1	...	...	1	...	...	...	...	...	1	...	2	1	...	...	3	...	...	...	1	1	...	...	...	1	1	...	3	1	...	3	...	1	...	...	1	...	...	1	...	...	...	...
Thigh	17	4	2	1	2	6	2	4	...	...	...	1	2	1	...	2	...	...	...	...	...	1	1	1	...	...	...	1	...	...	...	1	1	...	...	...	1	1	...	4	2	...	1	4	1	...	...	...	2	...	...	2	...	...	...
	68	24	4	6	5	18	3																																																

STATISTICS OF MAJOR OPERATIONS PERFORMED AT ST. MARY'S HOSPITAL FOR WOMEN AND CHILDREN, MANCHESTER, FROM JULY 1, 1874, TO JUNE 30, 1875.

COLLECTED BY C. J. CULLINGWORTH, ESQ.,
SURGEON TO THE HOSPITAL.

Removal of breast.

No.	Date.	Age.	Nature of tumour.	Result.
	1874			
1	July 15	29	Scirrhus	July 23.—Surface of wound (6 in. × 4½ in.) healthy. Aug. 7.—Abscess opened at junction of nipple and axillary lines. Sept. 12. —Nearly healed; made out-patient.
2	Aug. 5	22	Non-cancerous	Cured. Sept. 7.—Made out-patient.
3	" 12	54	Scirrhus	Sept. 26.—Made out-patient; wound healed.
4	" 26	68	"	Sept. 26.—Discharged; wound nearly healed.
5	Oct. 14	39	"	Dec. 26.—Death from bronchitis.
	1875			
6	Jan. 27	54	"	Feb. 27.—Discharged; wound healed. Operated on again Aug. 7, 1875. Discharged Oct. 20, wound healing, but unable to leave her bed.
7	Feb. 24	54	"	April 24.—Discharged; wound healed.
8	Mar. 24	44	"	May 1. " "
9	April 28	49	"	June 12. " "
10	"	31	"	May 15. " "
11	June 30	47	Adenoma, 5½ in. × 5½ in.	July 21.—Discharged cured.

Excisions.

No.	Date.	Age.	Sex.	Joint.	Disease or injury.	Result.
	1874					
1	July 8	11	F.	Hip	Disease of head of femur	Feb. 27, 1875.—Left the hospital with discharge from one small sinus; could bear weight fairly.
2	„ 15	5	M.	„	Disease of acetabulum and neck of femur	Feb. 6, 1875.—Made out-patient; unable to bear weight; slight purulent discharge. July 2, 1875.—Four small sinuses; shortening 1¾ in.; walks with crutches.
3	Aug. 12	7	M.	„	Disease of head of femur	Feb. 27, 1875.—Left the hospital with scarcely any discharge from wound. May 4, 1875.—Walks with crutch; shortening 1¼ in.; can abduct and adduct limb, but not rotate; four very small sinuses, with trifling discharge; general health very good.
4	Oct. 21	3	F.	Knee	Disease	Firm union. Discharged March 15, 1875.

Ovariotomy.

No.	Date.	Age.	Nature of tumour.	Treatment of pedicle.	Result.
	1874				
1	Sept. 9	39	Multilocular	Clamp	Discharged cured Oct. 24.
	1875				
2	Feb. 10	36	Multilocular cyst of broad ligament	Ligature; pedicle returned	Died Feb. 11.
3	Mar. 10	31	Unilocular	Clamp	Died March 14.
4	April 14	64	Multilocular	Clamp	Died April 16.
5	June 23	17	Unilocular	Ligature; pedicle returned	Discharged cured July 17

Miscellaneous.

	No. of cases.
Vesico-vaginal fistula	1
Vaginal anus	1
Tumours, viz.:	
One near the shoulders (lipoma)	16
One of breast (fibroma)	
One of abdominal parietes (carcinoma)	
Five of urethra (vascular)	
Three of labia pudendi	
Five of uterus (epithelioma, 2; polypus, 3)	
Inversion of uterus	1
Hypertrophy of clitoris	1
Harelip	7
Intestinal fistula (situated at umbilicus in an adult)	1
Fistula in ano	1
Necrosis of bone	2
Hæmorrhoids	1
Nævus (ligature)	2

OPERATIONS AT THE SALFORD ROYAL HOSPITAL.

Collected by J. H. Morris, Esq., House-Surgeon.

No.	Date.	Age.	Sex.	Nature of injury or disease.	Operation.	Result and date.
1	1874, Aug. 12	40	M.	Compound comminuted fractured forearm	Primary amputation	Discharged Sept. 7, stump quite healed.
2	„ „ 26	21	M.	Ditto	Ditto	Do. Sept. 22 „ „
3	„ Oct. 14	21	F.	Strumous disease of knee	Amputation of thigh (lower third)	Do. Dec. 18 „ „
4	„ Nov. 4	25	F.	Unhealed cicatrix from primary amputation	Second amputation below the knee	Do. January, not quite healed.
5	„ „ 17	27	M.	Compound comminuted fracture of tibia and fibula	Primary amputation below the knee	Do. Feb. 13, stump quite healed.
6	„ Dec. 14	19	M.	Ditto	Secondary amputation of thigh	Do. June 15 „ not „
7	1875, Jan. 16	17	M.	Ditto of humerus	Primary amputation just below the shoulder-joint	Do. March 3, stump „
8	„ Apr. 5	25	F.	Unhealed stump from secondary amputation	Third amputation at knee-joint	Do. July, quite well, since then the cicatrix has ulcerated.
9	„ „ 13	25	M.	Compound comminuted fracture of humerus	Primary amputation	Do. May 25, stump quite healed.
10	„ „ 27	13	M.	Strumous disease of ankle-joint	Pirogoff's amputation	Do. Sept. 25 „ „
11	„ „ 27	18	M.	Ditto	Amputation (middle third)	Do. June 17 „ „
12	„ „ 29	49	M.	Inguinal hernia, right side down	Twelve hours' operation	Do. June 5, quite well.
13	„ May 3	52	M.	Compound comminuted fractured tibia and fibula	Secondary amputation	Death same day.
14	„ „ 25	55	F.	Scirrhus of breast	Removal	Discharged July 8, cicatrix healed.

2 cases of circumcision, 2 of epithelioma, 5 of necrosis of tibia, 5 of ligature of radial (accidents).

HOSPITAL FOR SICK CHILDREN, PENDLEBURY, MANCHESTER.

COLLECTED BY RICHARD HUGHES, ESQ., RESIDENT MEDICAL OFFICER.

Excisions.

No.	Age.	Sex.	Date of operation.	Joint.	Disease or injury.	Result and date of discharge.	Remarks.
1	8	M.	Sept. 22, 1874	Knee	Chronic disease	Afterwards amputated	Amyloid disease of liver and kidneys followed the excision, and the limb had to be removed.
2	8	F.	Feb. 16, 1875	Hip	Morbus coxæ	Followed by amputation	Amyloid disease of liver and kidneys followed.
3	4	M.	March 24 „	Knee	Chronic disease	Cured October 19th	—
4	9	F.	„ 24 „	Hip	Morbus coxæ	Still under treatment	—
5	9	M.	April 29 „	Knee	Chronic disease	„	—
6	4	M.	May 28 „	„	„	„	—
7	8	F.	June 23 „	„	„	„	—
8	13	F.	„ 14 „	Elbow	„	Cured October 15th	—

Amputations.

No.	Age.	Sex.	Date of operation.	Limb.	Disease.	Result and date.	Remarks.
1	6	M.	Sept. 22, 1874	Thigh	Chronic disease of knee	Cured November 3rd	—
2	10	M.	Aug. 7 „	„	„	„ September 18th	—
3	6	F.	Nov. 18 „	„	„	„ January 12th	—
4	8	M.	June 11, 1875	„	„	„ July 6th	—
5	8	F.	„ 23 „	At hip-joint	Morbus coxæ	„ November 26th	Excision was not successful.
6	5	F.	May 28 „	Thigh	Chronic disease of knee	„ July 2nd	—
7	8	M.	Oct. 22 „	„	„	„ March 2nd	Excision not successful.

Lithotomy.

Age.	Sex.	Date.	Result.
8	M.	Dec. 2nd, 1874	Cured Jan. 19th.

Miscellaneous.

	No. of cases.	
Tracheotomy (croup)	1	(Death from ulceration into innominate artery by pressure of tube, and hæmorrhage).
Caries of bone (amputation of toe 2, gouging 2)	4	
Necrosis of bone	1	
Tumours (eyelids and back 1, underlip 1)	2	
Excision of tonsils	1	
Division of cicatrix after burn	1	

Tabular View of the Major Operations performed in the Royal Infirmary, Royal Southern, and Northern Hospitals, in Liverpool, during the years 1873 *and* 1874.

	Royal Infirmary.		Royal Southern Hospital.		Northern Hospital.	
	Recovered.	Died.	Recovered.	Died.	Recovered.	Died.
Excision of the shoulder-joint	1	...	...	...	...	...
„ elbow „	7	1	...	...	3	...
„ wrist „	2	...	...	...	...	...
„ hip „	...	...	...	...	2	1
„ knee „	3	...	...	...	1	...
„ upper jaw	...	...	...	...	...	...
„ lower „	...	...	...	...	...	...
„ tongue partial	...	...	1	...	...	...
complete	2	1	1	...	...	..
Amputation of the arm primary	1	2 *f b*	14	...	5	...
secondary	...	...			...	...
„ forearm primary	2	...			5	...
secondary	5	...			1	...
„ hand primary	1	...	2	...	1	...
secondary	...	...			...	...
„ thigh primary	3	...	6	3	...	2 *b a*
secondary	2	5 *g g*			...	1 *b*
„ leg primary	7	2	7	1	8	1 *d*
secondary	5	2 *g*			5	1 *c*
„ foot primary	...	...	4	...	...	...
secondary	6	...			...	...
„ through shoulder-joint primary	1	2	...			
secondary	1	...		...	...	1 *a*
„ „ hip-joint primary	...	...	...	...	...	...
secondary	...	...	...	...	...	1 *c*
„ „ knee-joint primary	...	...	...	...	...	...
secondary	1	1 *g*	...	...	3	1 *d*
„ of the penis	1	...	1	...	...	...
Operation for ununited fracture	1	...	...	...	...	...
Lithotomy	9	...	2	...	1	...
Lithotrity	5	...	...	...	...	...
Ligation of the femoral artery	1	1	...	...	...	...
„ subclavian artery	...	1 *d*	...	...	...	...
„ axillary artery	...	1	...	...	...	...
Herniotomy	4	4	5	5	2	1 *e*
Perineal section for disease	7	2	...	...	1	...
for injury	...	1	...	...	3	1 *c*
Paracentesis thoracis	...	...	18	4	2	...
„ abdominis	...	...			4	...
Laryngotomy	...	...	...	1	1	...
Tracheotomy	1	...	1	1	...	...

	Royal Infirmary.		Royal Southern Hospital.		Northern Hospital.	
	Re-covered.	Died.	Re-covered.	Died.	Re-covered.	Died.
Excision of mamma { simple	11	2 *e*	...	...	4	...
Excision of mamma { with glands	5	1 *h*	...	...	...	...
„ eyeball	1	...	...	...	...	...
„ tumours	37	...	12	...	10	...
Holt's operation	...	...	...	...	1	...
Ovariotomy	2	1 *e*	...	...	1	2
Removal of necrosed bone	14	1 *g*	29	...	18	...
„ loose cartilages	...	...	...	...	...	...
Staphyloraphy	1	...	...	...	...	...
Trephining	1	...	3	...	...	2
Radical cure of hydrocele	...	...	...	...	3	...
Operation for vesico-vaginal fistula	1	...	...	...	2	...
„ harelip	...	...	2	...	...	...
Radical cure of hernia	1	...	...	...	...	...
Internal urethrotomy	1	...	...	...	...	...
Castration	5	...	...	...	...	...
Removal of whole of scapula	1	...	...	...	...	...

a. Died from tetanus.
b. „ shock.
c. „ exhaustion.
d. „ septicæmia.
e. „ collapse.
f. „ delirium tremens.
g. „ phthisis.
h. „ secondary hæmorrhage.

ABSTRACT OF THE PROCEEDINGS OF THE LIVERPOOL MEDICAL SOCIETY.

DURING THE SESSION 1874—1875.

October 8th.—Mr. McCheane, the President of the Society, delivered the introductory address. After welcoming the members, he proceeded to dilate upon the value of medical societies. He commented on the many advantages medical men had in Liverpool for maintaining a medical society in an efficient state. He pointed out the necessity that there was for discussion and the value of it, and referred particularly to the recent discussion on Mr. Hutchinson's paper "On the Efficacy of Mercury read before the Hunterian Society."

He alluded to the combined functions of the Society and the difficulty thus entailed in working the sections. After some remarks on the business of these he offered some suggestions, the carrying out of which would, he considered, be conducive to the harmonious working of the Society.

He referred to the claims of sanitary medicine as one of the most important topics of the day, and concluded his address with an account of the development of the Medical Institution.

October 22nd.—Mr. Michael Harris exhibited the bladder, rectum, and colon from a case in which colotomy was performed by Mr. Hakes in 1869, for supposed syphilitic disease of the rectum. There were fistulous communications with the bladder. The descending colon was opened, and the patient was relieved of much suffering, and did well for four years. He was admitted recently into the infirmary, and died with symptoms of uremic poisoning. The kidneys were found to be extensively diseased. The colon from the artificial anus to the rectum had degenerated into a fatty band and was quite closed; the fistulous opening into the bladder was also closed.

Mr. Harris also exhibited a fœtus in which there was a deficiency in the abdominal wall, with ectopia of the stomach and all the intestines.

Dr. **Grimes** gave particulars of a case of imperforate rectum operated on with success. The anus looked natural, and the child was healthy. As there had been no action of the bowels for the twenty-four hours after birth, an injection was given, which immediately returned. The finger introduced passed two inches, the cavity into which it entered was found gradually to contract and terminate. A few hours after, the apex of this cavity was found to have become inverted. In consultation with Mr. Banks this was punctured with the finest aspirating trochar passed through a canula; some dark fluid was withdrawn and the canula left in, the aperture was dilated gradually, and the child did well.

Mr. **Fred. Lowndes** read a paper entitled "The Disposal of the Dead in Liverpool, past and present; is Cremation preferable to Burial?" The author commented on the great interest Sir Henry Thomson's papers on cremation had created. He remarked that burial was very repulsive to many persons, and proceeded to sketch a history of burials in Liverpool, from the year 1371, when in consequence of "the black plague," burials were permitted in the graveyard of St. Nicholas Chapel to the present time.

Statistics were furnished firstly of the gradual increase of population from the year 1650 to the year 1871, when the last census was taken—of the number of deaths in Liverpool for the last twenty years, showing an annual average of 14,000, also statistics of burials in and around Liverpool, comprising between forty and fifty burial grounds, and showing a number of half a million interments since the commencement of the present century.

The process of cremation was then detailed, and the author of the paper stated his conclusions that cremation might be voluntarily adopted in large towns by all who expressed a wish to that effect, while burial was preferable in the country, and that burial should be as simple as possible.

November 5th.—Dr. **Turnbull** exhibited a specimen of ulcer in the duodenum seated near the pylorus, where there was much contraction; there was a second cicatrised ulcer in the stomach. His patient was a man æt. 46; the chief symptoms were vomiting of fermenting matters containing sarcinæ and emaciation.

Dr. **Harvey** exhibited an anencephalous fœtus with spina bifida; the parietal and occipital bones were absent, the brain protruding.

Mr. **Rhynalt Pughe** showed a bladder from the walls of which grew several villous tumours; one of the largest was near the orifice of the left ureter. The subject of the disease was a man, æt. 32, who died from typhus. Mr. Pughe had known him for four years; during that period he suffered from repeated attacks of hæmaturia at an interval of two or three months, particularly after exertion.

Dr. **Nevins** read a paper "On the Sanitary Results of the Contagious Diseases Acts upon the Army and Navy and Prostitutes registered under them, from the date of the first Act to the latest published official health return; being the substance of a report prepared for the Home Secretary, the Right Honorable R. A. Cross, with special reference to their proposed introduction into Liverpool." Dr. Nevins explained that he had been requested by the members of the association for the repeal of the Contagious Diseases Acts, to prepare a report on the working of these Acts for the Home Secretary. In doing this he confined himself entirely to official returns. Referring to numerous tables of figures, being the returns of the numbers of cases of gonorrhœa and venereal sores in fourteen places before and after the Acts had been introduced, he proceeded to prove that there had been a steady fall before and a rise after the Acts came into force in these towns, that the latest returns showed an increase of gonorrhœa, and only a very slight diminution in cases of venereal sores.

November 19th.—Dr. DICKINSON exhibited the kidneys, bladder, rectum, and lungs from a case of phthisis. The kidneys were very large; in the situation of the pyramids were large masses of tubercular matter, the bladder very small and congested, the mucous membrane of the rectum ulcerated, the lungs tubercular. The patient was a male, æt. 20. Illness commenced four months before seen by Dr. D. with swelling of the feet, difficulty in micturition, and diarrhœa; the patient gradually sank.

Dr. Dickinson also exhibited a heart and pericardium affected with pericarditis; the pericardium was adherent in places to the heart, thus forming sacculi which were distended with fluid. The case was interesting owing to the fact that an attempt had been made to remove the fluid from the pericardium by tapping, but failed owing to these adhesions.

He also showed a heart where there was extensive tricuspid and mitral disease. The chief feature of interest in the case was the fact that he had been under observation for two years, that he had entered the Northern Hospital seventeen times during that period suffering from dyspnœa, &c., and that his symptoms had always, excepting on the last occasion, been relieved by digitalis and iron.

Dr. GLYNN exhibited Dr. Handfield Jones's sphygmometer and explained its action.

Dr. WILLIAM CARTER related a case of Bright's disease with vomiting of urea. A female, æt. 34, pale and thin, of dissipated habits, petechia on the thighs and legs, no dropsy. Slight friction sound over base of the heart. Pulse 80; constantly vomiting, urine specific gravity 1011, no casts. Urea 16 grs. per 1000. The vomited matter brownish in colour, specific gravity 10·13. Contained albumen, of course, and urea in the proportion of 17 grs. per 1000. As the case progressed the urine diminished, but the vomiting continued till death. The kidneys were contracted, weighed four ounces.

Dr. **Wiglesworth** gave particulars of two cases of obstetrical complications.

Case 1.—A primipara, arm presentation. The right arm was in the vagina, and higher up the left, the child was directed towards the right side. Chloroform was given, and the left arm returned; on passing the hand into the uterus it came in contact with the fœtal occiput. The chloroform was pushed as far as was considered safe, but the head was so firmly grasped by the uterus that it was not possible to get the fingers behind it. Two attempts were made to terminate labour by version, but failed. The fœtal circulation having ceased, the arms were amputated near the shoulder, turning resorted to and the labour thus completed. In commenting on this case Dr. Wiglesworth remarked that either one of three courses might be adopted in similar cases, viz., evisceration, decapitation, or division of the vertebral column. Against the first of these was the fact that it could not from the position of the head be easily performed; and he preferred amputation to the last.

Case 2.—Dr. Wiglesworth was called to assist a medical man, and found the forceps applied to the fœtal head, the uterus was prolapsed, and the os uteri external. He at first attempted to deliver by hooking back the os with the fingers whilst making traction, but failed. Two incisions were then made into the os, and failing again, two more were made. On examining the parts after delivery little evidence of the incisions was discovered. The patient made a good recovery.

Dr. **Wiglesworth** remarked that the woman's first labour (the previous one) had been tedious, that the forceps had been used, and since then she had suffered from incomplete involution and prolapsus.

Dr. **Wallace** gave the first of a short series of papers on gynæcology—" On Retro-uterine Fœtation." After describing the classification of the varieties of extra-uterine fœtation, he proceeded to give particulars of a case recently under his own observation. His patient was the mother of several children. Her catamenia were regular, and previous to 1873 her health was good. Early in that year she commenced to suffer from pain, menorrhagia with muco-purulent discharges from the uterus, lost flesh, became cachectic and weak. She had been under the care of Mr. Banks for abdominal tumour, who at that time could not make out anything more than that there was considerable inflammatory thickening about the uterus. When Dr. Wallace saw her there was considerable discharge from the rectum; he found a tumour in Douglas' pouch, the uterus was fixed, its depth three and a half inches, os patulous, and granular. There were none of the characters of cancer except the pain, nor of fibroid, for the uterus was fixed, &c. The growth appeared to be an inflammatory exudation. On examination by the rectum an opening was found high up leading into the tumour, and fœtal bones could be felt; these were afterwards expelled almost entire (exhibited by Dr. Wallace). The case was treated by rectal injections of permanganate of potash, and tonics were given. The tumour gradually disappeared, the uterus diminished in size, and the woman made a good recovery.

December 3rd.—Mr. RUSHTON PARKER exhibited the humerus of a girl, æt. 11, amputated at the shoulder-joint for periosteal tumour. This tumour was of three months' growth, and was an alveolar sarcoma. He also exhibited a similar growth from the periosteum of the scapula, which had been removed by two operations on different occasions. This patient was nine years old, the growth of two months' duration. Mr. Parker pointed out how these sarcomas differed from the so-called cancers.

Dr. RAWDON showed a periosteal tumour of the lower jaw removed from a child æt. 3. Duration of growth four months.

Dr. WIGLESWORTH exhibited a metrotome designed by himself to cut from without inwards.

Mr. RUSHTON PARKER read a short paper "On a Few Amputations performed under Elastic Compression." He commenced by alluding to the simplicity of Professor Esmarch's invention; to its mode of action, pointing out that bloodless operations when performed before by manipulation, &c., had been necessarily carried out at the expense of great trouble. The elastic ligature, he considered, would be found useful in three classes of cases:—1st. A patient may be unable to spare blood; 2nd. To assist the operator in certain operations, such as removing a tumour from the thigh, &c.; 3rd. When the surgeon has little or no assistance. The whole method might be divided into two:—elastic compression, with or without bloodless operation.

Mr. Parker then described cases suitable for each mode of procedure, and gave the results of nine months' experience in the use of the elastic ligature.

December 17*th*.—Mr. **Banks** exhibited a neuromatous tumour, the size of a filbert, removed from the median nerve of a lad æt. 16. It had formed in the stump after amputation of the arm, and caused great pain. He also exhibited a small polypus removed from the rectum; it was situated just within the sphincter, and gave rise to much discomfort.

Dr. G. C. **Walker** showed the liver, spleen, and stomach removed from a girl, æt. 16, who had died in a few hours from hæmatemesis. The liver was cirrhotic, the spleen much enlarged, stomach healthy.

Dr. A. M. S. **Hamilton** gave particulars of a case of abdominal tumour. The patient was a carter, æt. 49; was admitted on two occasions into the Workhouse Hospital, on the first occasion complaining of debility only, but a few months afterwards on readmission suffered from vomiting and pain radiating from the back down the thighs. A tumour was felt in the abdomen with pulsatile expansion, a loud murmur was also audible anteriorly and posteriorly over it. At first it was considered to be an aneurism; subsequently, as the surface of the tumour became nodulated, its nature was more apparent. The tumour was about the size of a large potatoe, and surrounded the aorta.

Dr. **Desmond** exhibited a dysmenorrhœal membrane which had simulated uterine polypus. It was a perfect cast of the uterine cavity, about the one eighth of an inch in thickness: it was inverted, the smooth mucous surface of the cast being external and the villous external surface internal. Dr. Desmond discussed the various views entertained as to the mode of formation of such membranes, described the way in which they were thrown off, usually, as in this case, being inverted, detachment occurring first near the fundus. This part becomes depressed from the pressure of blood behind it, and as more is detached the fundus is increasingly depressed. Dr. Desmond's patient had for some time suffered from scanty menstruation: the menstrual discharge then became more profuse and frequent, and finally there was decided hæmorrhage for some weeks. On examination by the ordinary medical attendant, a large pyriform body was found projecting from the os uteri, which was mistaken for a polypus.

Dr. F. **Imlach** read a paper "On Ovaritis." His paper was based on a limited number of cases, and proceeded on the assumption that the disease might be detected by physical examination, but not by consideration of symptoms. The author of the paper dwelt chiefly on the frequent association of ovaritis with diseases of neighbouring parts, and on the difficulties met with in its diagnosis.

January 21*st*, 1875.—Dr. **Michael Harris** exhibited two fœtuses completely joined at the thorax and abdomen. They were female children, both had harelips and completely cleft palates. Between them they had four arms and four legs, four lungs, one heart, with two aortæ from the left ventricle; but the vessel directed towards one fœtus did not seem pervious, since no injecting fluid could be made to pass into it; there was one liver and one umbilical vein, with two epigastric arteries, two stomachs, one small and two large intestines.

Mr. A. M. S. **Hamilton** exhibited a stomach and œsophagus; the latter was completely obstructed by a fibrous stricture at its termination, the œsophagus was not dilated but greatly hypertrophied. The patient was a male æt. 65. He had suffered from attacks of hæmatemesis; during the last days of his life the smallest amount of fluid gradually regurgitated.

Dr. **Glynn** narrated a case where an aneurism of the second part of the aorta pressed on the left bronchus and other parts of the root of the left lung. His patient, a man æt. 34, was admitted into the Royal Infirmary suffering from cough attended with much expectoration. There was considerable effusion into the left pleura, and the physical signs of aortic aneurism, pulsation, and systolic murmur in the third left intercostal space near the sternum. One curious feature in the case was the very great compensating expansion of the right lung; its anterior border extended to the left, the left lung being collapsed, as far as the chondro-costal articulations, from the first to the sixth. The immediate cause of death was rupture into the left bronchus.

Dr. CATON read a paper "On the Electrical Relations of Muscle and Nerve." After a short historical sketch of the subject, the instruments to be used in the demonstration were explained, the principal being Sir Wm. Thompson's reflecting galvanometer, Du Bois-Reymond's non-polarizable electrodes, the induction apparatus, commutators, &c. The principal facts described in the paper were demonstrated in the following manner:—A scale, about eight feet in length, graduated like that of the galvanometer, was fixed on one of the walls of the theatre. A beam of light from an oxyhydrogen lamp was reflected from the mirror of the galvanometer on to the scale; thus every deflection of the needle was seen by all present. After the muscle current of the triceps of the frog had been shown, a nerve and muscle preparation was placed on the electrodes, the nerve being laid on a pair of platinum points, so as to allow of its stimulation by the interrupted current. The electric current of the muscle was seen to diminish whenever the muscle was caused to contract, by the stimulation of its nerve. Negative variation was also shown in the heart of the frog. The heart was contracting actively, and during the diastole a strong electrical current was manifest, while at every systole the ray of light fell towards zero. After a brief statement of Du Bois-Reymond's opinion as to the nature of the muscle current, and also a notice of Dr. Radcliff's theory, a demonstration was given of the electrical currents existing in nerves, and of the diminution of these when a sensory or motor impulse traverses the nerve. A description was given of the influence of the constant current of a battery in increasing or diminishing the excitability of nerve. Its effect on the natural electrical current was also stated. A few remarks on the practical applications of these principles in electro-therapeutics concluded the paper.

February 4th.—Mr. **Rushton Parker** exhibited a sebaceous cyst, remarkable from its extreme hardness, removed by Mr. Bickersteth from the arm of a gentleman.

He also showed part of a bladder in which a small calculus (size of a pea) was imbedded near one of the ureters; it could not positively be made out whether the orifice was obstructed or not; the symptoms rather lead to the belief that it was. The specimen had been obtained from a patient of Mr. Bickersteth's on whom the operation of crushing had been performed; the patient had a rigor and died; the right kidney, *i. e.* the organ on the side of the probably obstructed ureter, was much diseased.

Mr. Parker also exhibited a necrosed tibia removed from a boy. He had amputated the leg in this case, as the patient was sinking from surgical fever; the operation was attended with the best results. Mr. Parker made some remarks upon the very high temperature, 105° Fahr., and rapid pulse, 150, maintained in this case till the operation.

Dr. **Steele** exhibited some bones of a fœtal skull removed from the cavity of the uterus. The patient had come to the Lying-in Hospital complaining of much uterine discomfort, and stated that she had been delivered (?) by forceps six months before. He removed the pieces of bone after dilating the os uteri.

Dr. **Michael Harris** read a paper "On Double Vena Cava," and illustrated his paper by specimens and drawings. He described the position of parts in a case of this abnormality he had lately met with in the dissecting-room of the school of medicine. In this there were two superior cava and one inferior. One of the superior cavæ occupied the usual situation, while the other ran down from the left side of the aorta behind the pulmonary artery and root of the lung, to open at the back of the right auricle with the coronary sinus. There were no other abnormalities. There appeared to be no transverse branch connecting these two vessels. The woman from whom the specimen was obtained was fifty-six years of age, and had suffered from no symptom pointing to an irregular circulation. Dr. Harris stated that the fullest particulars respecting this malformation had been furnished by Mr. Marshall. He up to 1849 had only found eleven cases recorded, five in this country. In twenty other instances there were double cavæ, but this malformation was complicated with others. Dr. Harris had only been able to find notices of two since 1849. Cheselden was one of the first to describe the irregularity. Dr. Harris then gave an account of the mode in which the veins were developed, and pointed out how such abnormalities in arrangement and number of the great veins were probably produced.

Dr. **Steele** read a paper "On the Vectis as an Obstetric Instrument." He had hardly ever, he said, used the vectis, but as the instrument had recently been strongly recommended as more valuable than the forceps, he thought they might with advantage consider the relative merits of the two instruments. Its discovery, he said, was involved in obscurity. It first came into use about 1750, since which time it had been constantly employed with varying degrees of popularity. The author of the paper then quoted the opinions of various authorities on the value of the vectis. He pointed out that the chief objections to it as an obstetric instrument were, the danger attending its use if employed as a lever, and its inefficiency as a tractor and compressor; and as to the recommendation that its application was easier than that of the forceps, he considered no one should use the vectis who had not knowledge enough to use the forceps.

February 18*th*.—Dr. **Wallace** exhibited a placenta from a case of placenta previa. His patient was seven months pregnant with her first child; after a railway journey suffered from profuse hæmorrhage. On vaginal stethoscopy a bruit was heard posteriorly; in several days this disappeared; and Dr. Wallace predicted the child's death and the happy termination of the case without hæmorrhage or the necessity of interference.

Dr. Wallace also exhibited a very large flat pessary, probably of vulcanite, encrusted with phosphtes, which had been retained about three years; he had experienced the greatest difficulty in removing it. He pointed out how necessary it was to examine pessaries at regular periods in order to avoid such accidents.

Dr. **Chalmers** showed a brain obtained from a case of hydrocephalus; the head measured twenty-four inches round, and sixteen and a half from ear to ear. Strapping, mercury, &c., were tried, and then the head was punctured and three ounces of fluid removed without ill consequences at the time, but the child died some days afterwards suddenly. Fifty ounces of fluid were removed after death.

Dr. **Williams** exhibited a fibrous tumour (size of a child's head) removed from the back of the thigh of a man; it had grown from the cicatrix of a previous tumour; it gave rise to no pain, but caused great inconvenience in walking.

Dr. **Wallace** read the second of a series of gynæcological papers "On Retro-uterine Hæmatocele." After defining the term, he discussed the pathology of the affection, particularly the question of the relation of the blood tumour to the peritoneum. He enumerated the causes, dividing them into mechanical and medical or general, and quoted the opinion of various authors, as Simpson, Tilt, Matthews Duncan, and Virchow, on the subject. He then carefully considered various points connected with the differential diagnosis of the disease, and related cases which had come under his own observation.

Case 1.—*Retro-uterine hæmatocele becoming peri-uterine.*—R. W—, healthy, but not robust, married three years, never pregnant, suffered from dysmenorrhœa attended with convulsive attacks. Granular erosion of the os was found and the cervix was divided. The health was much improved by the operation. After twelve months the pain on menstruation returned, and was of an expulsive character. Dr. Wallace decided to divide the cervix again, but on sudden excitement, caused by fright, she fainted away and was put to bed. Dr. Wallace found her anxious, pale, with distended abdomen, &c.; the uterus was pushed to the right by a large tumour behind it, and in the left iliac fossa. There was profuse menstruation for a few days. Three months afterwards the tumour had decreased in size, and gradually disappeared. Subsequently she suffered from a relapse when there was hæmorrhage into the anterior peritoneal sac. In a second case recorded by the author the situation and course of the hæmatocele was much the same as in this case. In a third case there had evidently been much inflammation excited by the effused blood, which was discharged per rectum. This patient, while menstruating, "received a chill," the catamenia ceased, and violent pain in the abdomen followed. Some months afterwards Dr. Wallace examined her and found a ragged opening leading into Douglas's pouch. The case had somewhat the appearance of one of melanotic cancer, and was so regarded by a surgeon who saw it. Dr. Wallace, in concluding, referred to the treatment of hæmatocele, especially with reference to surgical interference. He considered that the rules Dr. West laid down were the best,—not to puncture so long as the tumour is diminishing or so long as the causes exist which produce it, and if a puncture is made, to make it at the most accessible part.

March 4th.—Mr. Rushton Parker exhibited a specimen of sarcoma of the lungs, obtained from a girl æt. 11, whose arm had been removed two months previously for sarcoma of the humerus. The duration of the disease was six months. He also exhibited a small aneurism of the middle cerebral artery, about the size of a pea, which had caused death by rupture.

Dr. Oxley exhibited the kidneys, brains, and lungs of a child æt. 6, the seat of what, on superficial examination, appeared to be cancer. On examination by the microscope the growth was found to consist of an infiltration of lymph-cells. The child, a boy, was admitted into the Children's

Infirmary, October, 1874. He was very pale, appeared to be dropsical; this was due not to œdema, but to the development of adipose tissue. His urine was not albuminous. In January he lost the sight of the left eye, the ball protruding for a time and then returned to its natural position, the sight being also restored. He gradually sank and died the end of February, 1874.

Dr. **Steele** showed a placenta in which was a large clot; it was obtained with a six months' child. The mother had never carried a child beyond the sixth month; she had a decided hæmorrhagic tendency.

Dr. **John Lewtas** made a short communication on a simple method of ensuring a view of the os uteri in the use of tubular specula. He recommended the introduction of a sound into the uterus, the use of this as a director to the speculum when any difficulty was experienced in bringing the os into view.

Dr. **Dickinson** gave some particulars of a case of syphilitic disease of the brain and cord, and exhibited the diseased parts. The patient was a man exhibited by Dr. Glynn at a meeting of the Society in the year 1873, with paralysis of the right hypoglossal nerve following violent pain in the back of the neck, and inability to move the head. Under rest in bed and iodide of potassium he had in a month or two almost recovered from this affection, but was a short time afterwards while walking in the street attacked with left hemiplegia. He was taken to the workhouse hospital and was in a month or two discharged much improved. In the beginning of the year 1875 he entered the Northern Hospital with various anomalous nerve symptoms, and died; after death an old clot was found in the right optic thalamus. The upper part of the spinal cord was much enlarged and the membranes over it were thickened and adherent to it.

Dr. **Lewis** read a paper entitled "Short Notes on the Value of Inunctions in Scarlatina." He commenced his paper with a few observations on the mode in which scarlatina was probably propagated, and after a few remarks on the old method of treatment by cold affusion related his experience in the use of inunctions. He employed suet, rubbed in night and morning. He had thus treated twenty-four cases of scarlatina from the commencement of the fever. The cases were, scarlatina simplex 13, anginosa 8, maligna 1. He had no deaths, desquamation in five cases, dropsy in four cases. These results were satisfactory, but he believed the chief value of inunction was that it prevented the spread of the disease chiefly by rendering the particles of epidermis detached by desquamation more heavy and less liable to be carried about. Dr. Lewis then related how, in several instances, he had by this method checked the spread of the disease in families where the children could not be isolated. In one instance there were two cases of scarlet fever in a family of six, in another, one case in a family of four, and in another, one case in a family of two.

March 18*th.*—Dr. Sheldon exhibited a calculus, shaped somewhat like a clove, removed with success from the urethra of a male child by incision; it had caused obstruction to the passage of urine.

Mr. R. Pughe showed for Dr. Michael Harris a fœtus with malformed head; three lobes projected from the occiput, being herniæ of the dura mater.

Dr. Glynn exhibited for Dr. Davidson, a specimen of hæmorrhage into the pons and right crus cerebri. The patient was a male, æt. 55. He was brought to the Northern Hospital in an insensible state, with general paralysis of the limbs, and abolition of reflex action and sensibility. The kidneys were granular and the arteries atheromatous.

Dr. Carter read a paper on "The Action of Gelseminum Sempervirens." He enumerated in the first place the preparations of gelseminum. He considered the more common, the tincture and liquid extract, especially the latter, the most useful. He narrated the results of a series of experiments where the drug had been administered to persons in health. The dose usually given was ♏xx; the symptoms caused by this dose were in all cases failure of muscular power; in the majority of cases there was slight ptosis and inability to raise the eyelids. The loss of muscular power in the eyelid Dr. Carter had estimated by fixing a pill box to the upper lids and weighting it with shot before and after the dose. In one instance, where three doses of the drug had been given, at one or two hours' interval there was general loss of power, the patient fell on the floor, and for some time appeared to be in a dangerous state. There was also usually dizziness, in some difficulty in speaking after one dose, double vision, &c. Its action on the vascular system was not very decided. The intellect in all cases remained perfectly clear. Dr. Carter considered that the drug resembled the conium maculatum in action, and so might be useful in cases of tetanus, &c. He had given it for two or three years, and had found it very useful in relieving the pain caused by carious teeth. He recommended that the dose should be gradually diminished after one of twenty minims had been given.

Dr. CAMPBELL read a short paper entitled "Observations on Death from Chloroform." The cases on which his observations were made were collected chiefly from the journals, and were seventeen in number; one death had occurred in dental practice, five in ophthalmic, and eleven in surgical. The method in which the chloroform was administered was recorded in ten cases. In two "Clover's apparatus" was used, in three a mask, in three a towel, and in two a sponge. The fatal dose varied from half a drachm to half an ounce. In seven out of ten cases where the dose was recorded it was two drachms and under. The phenomena attending death were recorded in ten cases. In seven there were violent struggles, in two none, in one vomiting. The post-mortem appearances in eight cases were:—In three the heart was healthy. In two fatty. In two the aorta was diseased. In four the right side of the heart was distended with fluid blood. The restoratives employed were galvanism, ice in the rectum, inversion of the body, &c. In conclusion, Dr. Campbell pointed out how frequently chloroform was administered, and how rarely it proved fatal, and remarked that we should not hastily accept any other anæsthetic.

Mr. **George Walker** read a short paper on the "Prevention of Death from Chloroform." Mr. Walker considered that death during the administration of chloroform from syncope was so rare that practically it was only necessary to guard against that from asphyxia. In all cases he believed the same phenomena were presented, and as a type of these he narrated the case of death from chloroform which occurred in the Broadmoor Asylum. Here a patient, æt. 60, died after a small dose of chloroform, given by "Clover's apparatus," the symptoms were violent struggles, lividity of the face, &c. The treatment resorted to was artificial respiration, galvanism, and friction. The post-mortem appearances were congestion of the lungs, distension of the right side of the heart with fluid blood. Mr. Walker considered that in this case, as in all others, the treatment was erroneous, that artificial respiration, galvanism, &c. were useless, but he believed that the best method of treating such cases was elevation of the body and head. He related two cases where he had resorted to this mode of procedure with success. He contended that the introduction of chloroform was attended with the greatest danger to those of plethoric habit, and that to these æther should be given.

April 1st.—Dr. **F. Imlach** exhibited a dolichocephalous skull, and described the mechanism of face presentations.

Dr. **Davidson** showed the heart and lungs from a patient with heart disease. The right side of the heart was hypertrophied, the mitral orifice contracted, the aorta and its valves healthy, but the pulmonary artery atheromatous, its valves healthy. There was emphysema of the lungs with hæmorrhagic infarction.

Dr. Davidson also showed a patient suffering from partial hemiplegia of left side, and paralysis of the third nerve—he believed in consequence of a syphilitic lesion near the right crus cerebri. This patient had had a chancre and there were signs of periostitis; the symptoms appeared suddenly, and were much relieved by the iodide of potassium. He remarked that such cases were rare, and that in those recorded, syphilis appeared to have existed.

Mr. NEWTON read a paper entitled "On the Stamping-out Process as applicable to the Eradication of all Communicable Diseases, with some reference to the Contagious Diseases Acts." He commenced by showing how cleanliness, isolation, and disinfection modified and checked the spread of itch and other skin diseases; how vaccination saved the lives of probably 80,000 persons in Great Britain yearly. Isolation was the chief measure, and he would urge the legislature to enforce the following conditions in cases of variola, scarlatina, &c.: 1st, the immediate notification of the disease having broken out; 2nd, the complete seclusion in a hospital, or at home, if possible, of those affected; 3rd, the surrounding of the sick with attendants who are themselves incapable of being affected; 4th, the disinfection before and after the disease by fresh air, water, chlorine, &c. To obtain so great a good as the annihilation of such infectious diseases would cause no doubt much personal inconvenience, and even curtail the liberty of the subject; but if the greatest happiness of the greatest number be the true principle of legislature, such objections will go for very little in comparison to the enormous good to be obtained. As an illustration Mr. Newton referred to the account given by Dr. Budd of the measures so succocessfully adopted by Mr. Davis, of Bristol, during the visit of cholera to that city in 1868. He then considered the means for stamping-out syphilis, referring to the Contagious Diseases Acts. Syphilis could be isolated with greater ease than smallpox, for the poison could be more easily traced to its source. Mr. Newton dilated upon the horrors of syphilis, the number of deaths caused by it, &c; he showed how little the legislature had done to check it till recently, when they bestirred themselves to do something for the army, leaving the civil population unprotected, so the Army Acts of 1864 and 1869 were passed. He described these Acts, particularly dwelling on the consideration displayed to those submitted to them, reading extracts from the 'Confidential Instructions for Surgeons.' Mr.

Newton pointed out how fearful was the state of things about Aldershot before the Acts were enforced, and how they had changed for the better afterwards. He then referred to the impediments offered to the working of the Acts, and the opposition to their extension by the party who opposed them—"to the disgusting details thrust before our wives and daughters, the aspersions cast on the medical profession," passed on to the consideration of Dr. Nevin's statistics and arguments, considered in detail many of the arguments advanced by the opponents of "the Acts," and concluded by observing "that all communicable diseases are for that very reason preventable ones and may be stamped out. . . ." "In that golden age yet to come, when science and education shall have permeated all ranks of society, then shall all those scourges of mankind be remembered only as things of the past. If in our day we do what we can to hasten that time, we shall not have lived in vain."

April 5th.—Dr. CHALMERS exhibited for Dr. Oxley the lungs of a child on the pleura of which were calcareous plates.

Dr. IRVINE exhibited double ovarian hydatid cysts.

Mr. RUSHTON PARKER showed masses of enlarged glands, probably waxy specimens of degeneration, removed after death from a child æt. 5, as well as an enlarged spleen, fatty liver, and waxy kidneys.

Dr. LYSTER gave particulars of two cases where he had amputated the leg by the supra-condyloid amputation. He described the operation, which, he said, was a modification of Carden's, with high femoral section; the advantages of the operation were, he considered, that the stump would bear a greater amount of pressure; the arteries, veins, &c., were divided transversely; the cut end of the femur was covered by an osseous curtain.

Dr. Lyster exhibited two patients on whom he had operated in the manner he described. The results of the operation were very satisfactory.

Mr. T. SHADFORD WALKER showed two cases of spontaneous iridectomy. Both patients were women, one young and the other old. A blow by a hard body on the globe was the cause of the injury in each case, which in both very closely resembled the iridectomy as performed for glaucoma, &c. In one case the sight was fair in the injured eye when corrected by a lens, and the sight of the sound eye unimpaired; in the other, which had not been treated, the sight was lost in the injured eye and much impaired in the sound eye. In both cases the lens had escaped under the conjunctivæ, through a rupture of the tissues near the cornea and been absorbed.

Mr. **Edgar Browne** read a paper on "Optic Neuritis." He opened his paper with a few remarks on the value of the study of the fundus of the eye as an aid to diagnosis of the behaviour of nerve tissue under certain morbid conditions. He observed that the changes in optic neuritis might be divided into two stages, those belonging to a period of vascular arrest ending in inflammation, and those belonging to a period of decline ending in atrophy. He described the appearances of the fundus during these stages. Mr. Browne then considered the significance of the changes in the fundus under two classes: 1st, choked disc from the venous arrest of intercranial pressure; 2nd, true neuritis from descending tissue changes; and discussed the pathology more particularly of the choked disc. He pointed out how necessary it was to examine the eye in all cases of cerebral disease; that often there was no dimness of vision in optic neuritis; that the existence of neuritis pointed to the nature, not the seat, of the disease; that in cases where it was unchecked it terminates in atrophy and loss of vision; and that treatment assisted recovery, and prevented this unfortunate ending.

April 29*th*.—Dr. **Chalmers** exhibited the kidneys and bladder of a patient who had died in the Children's Infirmary with uræmic symptoms and suppression. The kidneys were cystic and contracted; the bladder also contracted; ureters dilated. There was no history of scarlatina.

Dr. **Pollard** showed a specimen of cancer of the œsophagus.

It was situated opposite the bifurcation of the trachea. His patient was a man, æt. 64, who had been ill five months when first seen, and lived two months afterwards. He sank from exhaustion. Gastrotomy was not performed on account of the patient's age and unfortunate surroundings.

Mr. **Rushton Parker** gave particulars of two interesting cases of "Inguinal Hernia."

Case 1.—A man, æt. 28, had right inguinal hernia for twenty years, never wore a truss, and suffered little inconvenience. He came to the Royal Infirmary when it had been irreducible three days, with symptoms of obstruction. The stricture was found, on operating, in the middle of the ring and divided, and the hernia reduced. The symptoms, however, remained unalleviated, and the patient died in twelve days. After death general peritonitis was found, the intestines were glued inside the ring to the abdominal walls, a portion of gut was found outside the peritoneum, strangulated and ruptured, its contents, fæcal matter, having passed beneath the peritoneum, a great distance up the posterior surface of the abdomen.

Case 2.—A labourer, with right inguinal hernia, æt. 32. The hernia appeared when he was eighteen years of age. No truss was worn. Part could be reduced, part could not. The mass was divided into three lobes, one lobe felt like intestine, another as if it were a cyst containing fluid, and the third like omentum. He came under Mr. Parker's notice with slight symptoms of obstruction, eructation, but no vomiting. More acute symptoms supervened, accompanied with vomiting, and Mr. Parker operated, having attempted taxis, without success. The stricture was divided; intestine, with a small part of omentum, was found in the canal, and liberated. The lump in the scrotum consisted of omentum and fluid. The omentum was returned and the patient did well.

Dr. **Cameron** read a paper entitled, "On the Anatomical Seat of Spasmodic Asthma." Dr. Cameron considered that there could be no doubt as to the nervous origin of asthma, but thought that there were good grounds for questioning the conclusion which places the seat of the spasm in the bronchial tubes.

He did not believe that the small bronchial muscles could by their absolute force resist their powerful opponents; even such force as they could exercise was lessened by the resistance of the lung substance and the elasticity of the cartilages: the bronchial tubes were more passive than active in the machinery of respiration; in virtue of their elasticity, they yield and expand before the advancing wave of air, and recede as it ebbs: these tubes can hardly be conceived capable of closing sufficiently, owing to their structure, as to cause the symptoms of asthma. The glottis, Dr. Cameron considered, was a more likely place for the spasm; its very situation commands the passage to the lungs; its normal functions and delicate organization present conditions in the highest degree favorable to such an occurrence; and the diseases to which it is subject bear in some instances a striking analogy to spasmodic asthma. Dr. Cameron believed that the glottis became widened during inspiration and narrower during expiration; the glottis guards the entrance to the lungs, is very sensitive, so that its orifice closes spasmodically on the intrusion of any irritating substance. This natural endowment might exist in excess, so that the muscles fall into a state of spasm on very slight irritation. In asthma, as well as in spasm of the glottis, the lesion would consist simply of this perversion of the natural functions of the glottis. Clinical observation, he contended, supported this view of the origin of asthma; vibrating rhonchi invariably attend the asthmatic attack, and are heard in greatest intensity over the larynx, becoming feebler as the stethoscope is moved downwards to the chest, and in the chest are only audible in the larger bronchi, and not in the smaller tubes, which we are told is the seat of the spasm. The voice was altered, enfeebled more than could be due to want of breath only. The cough, if present, had a stridulous sound, &c. Dr. Cameron considered that this spasm of the glottis was met with in a chronic form, causing the chronic wheezing dyspnœa, either following acute attacks or coming on gradually, attended with feeble voice and perhaps stridulous cough. The persistence of the laryngeal symptoms in the advanced stage of this disease could not probably be due exclusively to spasm, but rather to changes analogous to paralysis, defective action following over-action. In a case of chronic dyspnœa, he had found the glottis more widely dilated than usual, and noted its imperfect closure during expiration. Dr. Cameron finally, in support of the theory he advanced, directed attention to collateral evidence obtained from disorders to which the glottis is subject, to spasm of the glottis, laryngismus stridulus, and to the dyspnœa occasionally accompanying intra-thoracic tumours. Respecting these attacks he pointed out how they occurred at intervals, often unaccountably; at other times excited by trifling derangement, atmospheric vicissitudes, &c., the dyspnœa is attended with a stridulous sound, and cough, feebleness of the voice: so great is the resemblance that in some instances patients have been considered to be suffering from asthma.

May 13*th*.—Dr. **Wallace** exhibited a specimen of perforating ulcer of the stomach. The patient was a female, a servant, æt. 22. She had suffered from dyspepsia some weeks before death, but this had been relieved; death took place suddenly.

He also showed a specimen of perforating ulcer of the duodenum, obtained from a middle-aged, apparently healthy man. He had not suffered from any form of dyspepsia, was attacked with vomiting after supper, and died in a few hours.

Dr. Wallace also exhibited a specimen of perforating ulcer of the cæcum, from a child æt. 7; there was a history of eighteen months' pain and tenderness over the cæcum; the ulceration was probably due to irritation from grape seeds.

Dr. **Bligh** showed the heart of a man who had been stabbed; the apex of the left ventricle was wounded, the knife had entered two inches below the nipple in the line of the costochondroid articulations.

Dr. **Davidson** exhibited a liver in which there were syphilitic gummata.

He and Dr. **Glynn** exhibited patients suffering from cerebrospinal sclerosis.

Mr. **Banks** read a paper "On the Transformation of the Wolffian Bodies and their Ducts," illustrated by numerous preparations and diagrams. He gave an elaborate description of the Wolffian bodies from their early appearance to the period when they wasted, leaving their ducts. He described the relation of these ducts to Müller's tubes and the part they take in the development of the generative apparatus in both sexes, defining at the same time the changes which the mesorchium and organ of Rosenmüller underwent. He gave a detailed account of those parts in the matured being of either sex, which were considered to be remains of the Wolffian bodies, and the various ducts, and concluded with a few remarks of a practical nature.

May 27th.—Dr. **Shearer** exhibited the cerebellum from a patient, æt. 16, who had suffered from epilepsy since infancy. He stated that there was sclerosis of the brain and enlargement of the spinal gland.

Dr. **Cameron** showed the parts from a case of diaphragmatic hernia with intestinal obstruction; the hernia was diagnosed during life from the physical signs and symptoms. The patient was a tailor, had been stabbed three years previously between the seventh and eighth ribs, in a line with the posterior boundary of the axilla, had two attacks of obstruction previously, one two years and another six months before the fatal one. On admission the symptoms were vomiting, constipation, apyrexia, and absence of tympanitic distension; the ejected matter was bile, and was not stercoraceous; pain was referred especially to the left hypochondrium; there was extreme restlessness and lividity, or a tendency to it at an early period. *Physical signs.*—Peculiar clear resonance over the lower part of the chest on the left, and feeble respiratory murmur. After death it was found that the large end of the stomach, part of the jejunum, and six or eight inches of the colon with the omentum, had passed into the chest through a hole in the diaphragm; the stomach was twisted on itself and the omentum was adherent.

Dr. **Glynn** exhibited a cerebellum in the left lateral lobe of which was an abscess the size of a walnut, and gave particulars of the case; the chief symptoms were violent occipital pain, vomiting, constipation, and retraction of the abdomen; there was no paralysis or loss of sensation. The patient died comatose. Had complained of pain in the head for about six months. Ophthalmoscopic examination revealed no changes in the fundus oculi.

Dr. **John Lewtas** narrated a case of syphilitic disease (?) of the brain, terminating in recovery. A man, æt. 27, suffered from great pain in the right side of the head; the right side of the face was slightly paralysed, and he spoke thickly; was unable to close the right eye; there was diminished contractility of that side under the faradaic current; he staggered in walking; complained of buzzing in the right ear. He remained in this condition for about twelve days, then vomiting set in; twitching of the muscles of the limbs, &c. Iodide of potassium was given; he was next attacked with symptoms of lung disorder and unilateral convulsions of the right side; under the same treatment, however, he improved slowly and recovered. Dr. Lewtas thought that there had been in this case some inflammatory mischief about the base, which attacked the cranial nerves in succession.

Dr. **Caton** gave the history of a case where there was a tumour of the cerebellum, and exhibited the specimen. A male, æt. 28, manager of a farm; twelve years before had rheumatic fever; his heart was implicated, but his health was excellent. He was first seen January 15th, 1875. Eleven days before he had been very actively employed. When seen he complained of pulsating headache, and this seldom left him; vomiting and tinnitus. There was a double aortic murmur; gait unsteady; no paralysis; no history of syphilis; urine normal. Bromide of potassium ordered. There followed great and increasing muscular weakness, extreme slowness in accommodation for vision, with spectra. Optic neuritis was discovered, the patient became blind; delirium succeeded, and there was hemiplegia before death. The tumour was about the size of a walnut, was adjacent to the pons and under the left auditory nerve.

Dr. LODGE read a paper "On the Value of Properly Performed Vaccination." He stated that there was a large amount of imperfect vaccination in the town, owing to prejudice on the part of the public as to the number of vesicles necessary, &c. He referred to Dr. Fenton's and Mr. Mason's observations on the necessity of producing four or more vesicles, alluded to the precautions to be observed in the selection of a child, and lymph and described what he considered to be the proper mode of vaccinating.

Dr. WALLACE read a paper entitled "On the True Mechanism of the Outlet in Natural Labour, and its Practical Applications." He agreed with most authors as to the mechanism of the earlier stages of the passage of the head through the pelvis; but described a peculiar spiral movement as accompanying its descent through the bony outlet.

The honorary secretary for the ordinary meetings read his report of the proceedings during the session,

A BRIEF HISTORY OF THE LIBRARY OF THE MANCHESTER MEDICAL SOCIETY.

BY CHARLES J. CULLINGWORTH, HONORARY LIBRARIAN.

THE removal of the library of the Manchester Medical Society from the Royal Institution in Mosley Street to the new medical school buildings adjoining the Owens College will be an accomplished fact by the time the present volume issues from the press, and forms a distinct and interesting epoch in the history of the library. An apology is scarcely necessary for taking this opportunity of furnishing the readers of the 'Liverpool and Manchester Reports' with a brief account of the orgin of this library, its gradual development in spite of many difficulties, and its present condition. The record of its earlier years is that of a struggle for bare existence. Many who should have been its warmest supporters looked on coldly, and kept themselves aloof. Slowly, therefore, and by earnest work rather than by the countenance of the leaders of the profession in Manchester it had to make itself a position, and upwards of thirty years elapsed before its popularity can be said to have even commenced. Now it has taken its stand as one of the most important of the medical libraries of Great Britain. All this will make the history none the less interesting to members of the medical profession, many of whom could tell a somewhat similar story of long years of work, and waiting, and obscurity, crowned at last by eminence, and prosperity, and well-won fame.

The Manchester Medical Society was established, in the year 1834, " to provide for the medical profession of Manchester and the neighbourhood a library and reading-room, where the members can consult the works of the standard writers on medicine as well as the medical journals and periodicals." The late Dr. Hull was its first president, and two of its most active promoters were Messrs. Catlow and Walker. A number of books were given, and these formed the nucleus of the present library. The following are some of the names which appear upon the roll of these earliest benefactors:—Dr. Ashton, Dr. Banks, Dr. S. A. Bardsley, Sir James L. Bardsley, Dr. Hull, R. T. Hunt, Esq., Dr. Radford, and John Windsor, Esq. In the following year a catalogue was compiled which showed the Society to be in possession of 1075 volumes and pamphlets. This was not a sufficiently large collection to attract a great number of subscribers, and, in 1844, when the Society had existed for ten years, the annual income only amounted to £71, a sum which, after deducting necessary expenses, left but little money available for the purchase of books. The Society took up its quarters in the Royal Institution in 1845, and ten years afterwards had made so little advance in popularity that its income for the year 1854 was only £70 9s. actually a little less than it had been in 1844. At this junction the committee received a communication from the council of the Royal Institution to the effect that the Society could no longer be permitted to continue its occupation of rooms at the Institution. The committee after careful consideration of the Society's financial position came to the conclusion that to be compelled to leave its present quarters just then would almost inevitably involve dissolution. Eventually negotiations were entered into with the council of the Royal Institution which ended in the Society becoming a section of the Institution, the library being handed over in trust for the Society.

The committee for the year 1856 reported the finances of the Society to be still in an unsatisfactory state, and an urgent appeal was addressed to the medical men of the neighbourhood, soliciting help; this resulted in the addition of 300 volumes to the library. At this critical period in its history it is scarcely too much to say that the Society was saved from dissolution by the praiseworthy activity of its honorary secretary, Dr. Crompton. In May, 1857, 2558 volumes and pamphlets were entered in the stock-book, showing an average annual increase, from the year in which the Society was founded, of 66½ volumes or pamphlets. In that year Mr. Thomas Windsor undertook the examination of the whole of the books in the library, and in his report to the committee made some important suggestions. "*As to the future,*" he says, "I should wish to remark that, in my opinion, the greatest value of a public library being to present to private individuals works, or collections of works, which they could not otherwise obtain, the points in which such a library should be particularly rich would be:—1. Books of plates, &c. 2. Dictionaries, cyclopœdias, &c. 3. Periodicals. 4. Old and scarce works. 5. Foreign works. Now, if we consider the condition of the library in regard to these points, we shall find immense deficiencies; . . . . to supply these deficiencies seems to me the point of greatest importance to the library, and one that can only be done by fixed views, long and steadily pursued." At the urgent request of the Committee Mr. Windsor was induced to accept the post of honorary librarian in 1858, and a library catalogue bearing date the same year, with his name on the title-page, testifies to the energy with which he entered upon the duties of his appointment. Carrying into effect, as far as the funds at his disposal would from time to time admit, the suggestions embodied in his first report, he now earnestly set about the task of forming a really valuable library, and although his name, as librarian, disappeared in 1864* from the list of office-bearers, the subsequent history of the library is to a large extent the history of Mr. Thomas Windsor's untiring zeal and labour. His services were recognised in 1862 by the presentation of an address and testimonial of books. The honorary librarians who have succeeded him have always had the advantage of his counsel and supervision, and he has continued up to the present time to undertake the selection and purchase of old, scarce, and foreign books, which, from his intimate acquaintance with medical literature, and with the British and foreign book-markets, he has been able to effect with great judgment and at a comparatively small outlay.

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* Already, at the close of the year 1864, Mr. Windsor was able to conclude his report by stating his belief that the library was "far in advance of any other provincial medical library."

But to return. The year 1860 was made memorable in the Society's annals by the munificent donation by Dr. Charles Clay of his valuable library of obstetrical works, consisting of nearly 1000 volumes (including duplicates). In the following year a youth was engaged to act as assistant librarian, and in 1863 a very important alteration was made in the amount of the annual subscription. Hitherto the subscription had been one guinea for each member; an entrance fee had also been exacted until within the few previous years; now, the subscription for members resident within three miles of the exchange was, notwithstanding some opposition, raised to two guineas, and the subsequent increase in the prosperity of the Society has borne ample witness to the policy of this change. A larger sum was thus made available for the purchase of books, and so the library became year by year more extensive and more attractive. The number of volumes, excluding pamphlets, was 6594 in 1863, 9582 in 1870, and 12,527 in 1873, the average annual increase during the years 1870-73 being nearly 1000 volumes. When it is borne in mind that this was accomplished with an income averaging, during the years 1870-73, £253 2s., out of which sum the rent and all the other current expenses had to be defrayed, it will readily be seen that the money available for the buying of books must have been laid out with unusual discretion, watchfulness, and economy.

Mr. Windsor's immediate successor in the post of honorary librarian was Dr. John Roberts, who held office for five years (1864 to 1868). In 1866 he prepared a complete alphabetical catalogue of the library, which was printed and distributed amongst the members in the form of an octavo volume of 462 pages. A supplementary catalogue, consisting of 310 pages, was issued in 1872, having been prepared for the press by the late Dr. C. Currie Ritchie, one of the then honorary librarians.

A large reference catalogue, now lying on the library table, was formed by combining these two in a folio volume, interleaved for manuscript additions. The labour of preparing this, and of completing it up to the present time,* devolved upon the present honorary librarian, who was actively engaged upon this work for three years. Some of the members of the Society, thinking that such a service deserved special recognition, presented him in 1874 with a valuable timepiece, as a substantial proof of their appreciation.

Amongst the members who, in addition to those already alluded to, have taken the most prominent part in the actual working of the Society during the last eighteen years we may especially mention the following:—Mr. John Windsor, Dr. Borchardt, and Mr. Lund, who have successively filled the not always enviable post of treasurer to the Society; Dr. William Roberts, Dr. Thorburn, Mr. William Heath, and Mr. Walter Whitehead, each of whom has acted as honorary secretary for a series of years; and Dr. Little, Dr. Finlayson, and Dr. Glascott, who have severally officiated as honorary librarians.

When the Manchester Royal School of Medicine and Surgery became attached to the Owens College, it was necessary to erect suitable buildings near to the College for the purposes of medical education, and, in the plan prepared by Mr. Waterhouse, large and suitable rooms were set apart for a library and museum, which were intended to form a prominent feature in the new school. It occurred to Mr. Windsor that great advantage would be gained if the library of the Manchester Medical Society could be transferred to the new building. On the one hand, the College authorities would thus at once have at their command a large and valuable medical library, anything approaching to which would occupy many years in the collecting; while, on the other hand, the Medical Society would have largely increased accommodation for their books and for the holding of their meetings. The only room which the Council of the Royal Institution was able to place at the disposal of the medical section was already becoming inconveniently crowded, and, at the present rate of increase in the number of books, the question as to where to turn for more room would speedily become very urgent. The prospect, therefore, of a room capable of containing 30,000 volumes, and of a home for the library which would be practically permanent, was not one to be lightly cast aside. Negotiations were accordingly entered into with the Council of Owens College, and liberal terms were proposed to the Medical Society for acceptance. It is not necessary, in this brief sketch, to enter into all the details of the new scheme. A special meeting of the members of the Medical Society was summoned to consider the desirability of the negotiations with the College, and the unanimous vote of that meeting was in favour of their being continued; the Council and Governors of the Royal Institution offered no opposition to the cancelling of the deed of agreement whereby the Medical Society became a section of the Institution. The negotiations with the College authorities proceeded, therefore, without hindrance, and the Medical Society, no longer an appendage of the Royal Institution, has now removed to the medical school buildings in Coupland Street, Oxford Road. Not that the Medical Society has in any sense forfeited its individual existence. By the deed of arrangement between the Council of Owens College and the Committee of the Medical Society the Society will continue to be governed by its own laws; and if, at any time, after due notice from either of the contracting bodies, the arrangement should cease, the library will remain the sole property of the Society.

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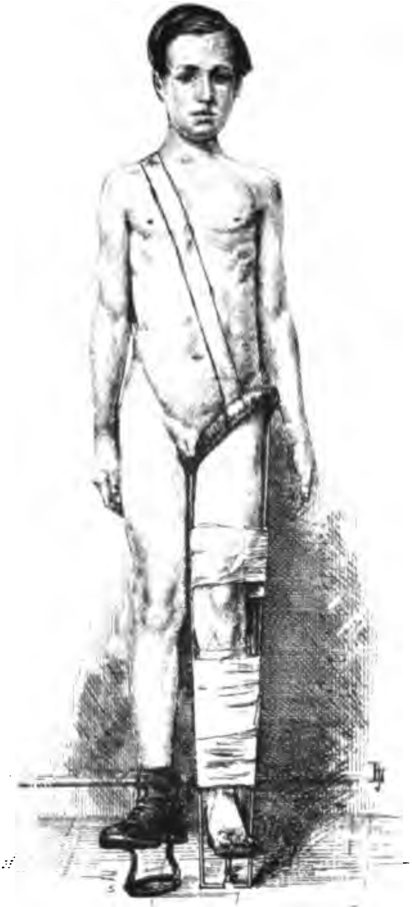
* In the year 1874 alone, when there were no longer many arrears to swell the number, the new entries in the manuscript portion of the catalogue numbered 2000.

It now only remains for me to mention very briefly the advantages which the medical society offers to its members, *in addition to* those which accrue from the possession of such a library as that whose history I have been sketching. During eight months of the year monthly meetings are held for the purpose of receiving communications and holding discussions on subjects relating to the science of medicine. Each meeting lasts two hours, of which the first is set apart for the communication of interesting cases or new modes of treatment, for the examination of patients, and for the exhibition of new instruments or inventions, and of pathological specimens; while the second is occupied with the reading of a paper and a discussion thereupon. In addition to these general meetings, others are held for the especial purpose of furthering microscopical investigation. These are conducted under the auspices of a microscopical section of the Society, whose members pay a small subscription annually for the purchase of instruments, and of books and periodicals relating to microscopical science, and for the expenses attendant upon the issuing of circulars, &c. Both the microscopical and general meetings are highly valued and [illegible] attended.

It will have been made perfectly apparent from the foregoing sketch that this library owes its origin, its sustentation, and its development entirely to the medical profession. [illegible] which, in [illegible], an appeal for help was [illegible] the general public, not one obolus, not one poor [illegible] was received in response. Yet it is obvious [illegible] of such an important reference library of [illegible] a matter of personal interest to every [illegible] enabling the professional advisers of the [illegible] with the advances made from [illegible] and practice of medicine. Every- [illegible] character of the medical [illegible] an indisputable gain to the [illegible] be sincerely hoped that, [illegible] the promotion of science [illegible] of a lifetime, and [illegible] honoured and esteemed [illegible] some of the wealthier [illegible] found willing to help [illegible] the medical society of [illegible] and render it still more [illegible]

examination of patients, and for the exhibitionof new instruments or inventions, and of pathological specimens; while the second is occupied with the reading of a paper and a discussion thereupon. In addition to these general meetings, others are held for the especial purpose of furthering microscopical investigation. These are conducted under the auspices of a microscopical section of the Society, whose members pay a small subscription annually for the purchase of instruments, and of books and periodicals relating to microscopical science, and for the expenses attendant upon the issuing of circulars, &c. Both the microscopical and general meetings are highly valued and largely attended.

It will have been made perfectly apparent from the foregoing sketch that this library owes its origin, its sustentation, and its development entirely to the medical profession. On the single occasion when, in 1859, an appeal for help was addressed to the general public, not one obolus, not one poor little duodecimo, was received in response. Yet it is obvious that the existence of such an important reference library of medical literature is a matter of personal interest to every citizen, as a means of enabling the professional advisers of the community to aquaint themselves with the advances made from time to time in the science and practice of medicine. Everything that tends to raise the scientific character of the medical profession is, in the long run, an indisputable gain to the public at large. It is, therefore, to be sincerely hoped that, in these more enlightened days, when the promotion of science is held to be amongst the worthiest objects of a lifetime, and when scientific men are more highly honoured and esteemed than ever before in the world's history, some of the wealthier members of the community will be found willing to help forward this good work, and enable the medical society of Manchester further to enrich its library, and render it still more worthy of so important a city..



REVIEW.

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*Thomas on Diseases of the Hip, Knee, and Ankle Joints.**

IN this treatise Mr. Thomas introduces a new mechanical arrangement for the treatment of joint-disease, by means of which the affected joint can be kept at complete rest, and cure promoted without confinement of the patient to bed. With regard to the arrangement and application of the apparatus, it may be well to let the author explain himself. He says: "We will suppose the patient, a boy of about ten years of age, having been examined, and the affection diagnosed as disease of the right hip-joint, the surgeon proceeds to measure him for the instrument. He then requests the patient to stand on the left limb (the one supposed to be sound), and then places under the sole of the right foot a block or a book, one inch thick, telling him to rest the foot of the affected limb on it. If the spine is then straight, he is ready to have the contour of the sound limb taken. If the spine is not of normal line, then add another block, or several blocks, until the unsound limb is raised sufficiently to allow the spine to resume its natural condition. Now take a long flat piece of malleable iron, one inch by a quarter, for an adult, and three quarters of an inch by a quarter for children, and long enough to extend from the lower angle of the shoulder-blade, in a perpendicular line downwards over the lumbar region, across the pelvis slightly external to the posterior superior spinous process of ilium, and the prominence of the buttock, along the course of the sciatic nerve to a point slightly internal to the centre of the extremity of the calf of the leg. The iron must be carefully modelled to this track to avoid excoriations, which would otherwise trouble the patient during treatment. This iron forms the upright portion. It is also very necessary that this upright should come below the knee to enable the surgeon to fix this joint, otherwise the patient would flex the knee, and rising the leg as a lever, would strain the hip-joint. Then measure round the chest, a little below the axilla, deducting in the case of an adult three inches from the chest circumference. The latter will be the measure for the upper cross-piece, which is made from a piece of hoop-iron, one and a half inch by one eighth of an inch. The hoop-iron is firmly jointed, with a rivet to the top of the upright, as shown in Pl. iv, fig. 4, at one third of its length from the end next to the diseased side, as Plate iv, fig. 2 *s*.

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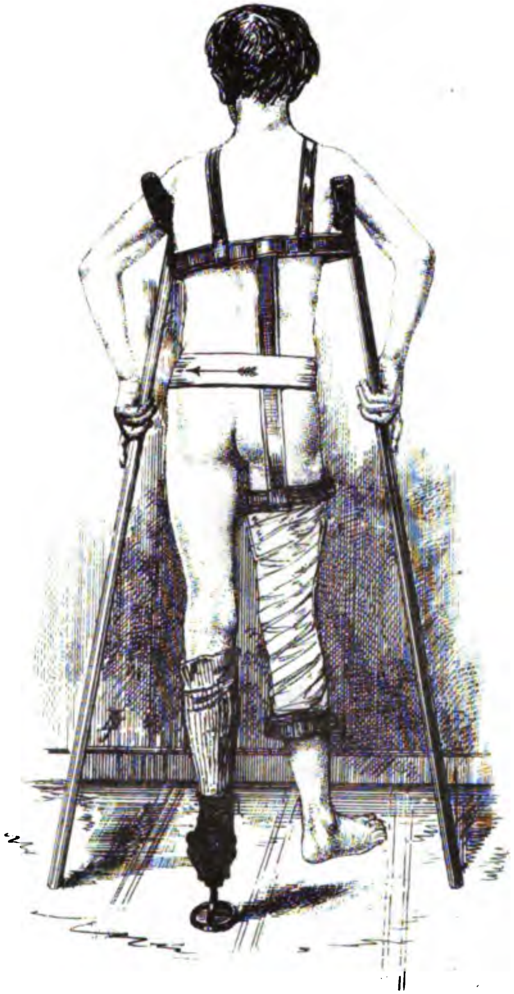
* 'Diseases of the Hip-, Knee-, and Ankle-joints, and their Treatment by a New and Efficient Method,' by Hugh Owen Thomas, Liverpool. T. Doft and Co.

Fig. 2 in Pl. 4 shows the upper ring modelled to the outline of the trunk, which is oval in shape. It is important to give the upper crescent this oval shape, otherwise the machine will rotate from its position behind the body; also inversion of the limb will occur. Another strap of hoop metal, six tenths of an inch by one eighth of an inch, and in length half the circumference of the thigh, is fastened to the upright, at a position from one to two inches below the fold of the buttock, as in fig. 4 B Pl. 4, according to the age of the patient, then another piece of metal of like strength, equal to half the circumference of the leg at the calf, and is firmly rivetted to the lower extremity of the upright." To understand the description it would be well to consult the accompanying plate. The instrument is afterwards padded and covered with basil leather.

Mr. Thomas divides the treatment of hip-joint disease with his apparatus into four stages:—(1) The stage during which confinement to bed is necessary, the splint being kept constantly applied. This stage is generally of some weeks' duration, and lasts until nocturnal pains and disturbed sleep have ceased. During the second stage "the patient is allowed to go about with the help of crutches. The frame continued and an iron patten placed under the shoe of the sound limb." These



must be continued until the limb is well atrophied around the great trochanter. The accompanying plate gives a view of the splint as applied in this stage. During the third stage the patient is allowed to take off the splint while in bed, replacing it before getting up, and still continuing to use the crutch and patten during the day. During the fourth stage the framework splint is discontinued, the crutch and patten only being used. These are continued until a permanent cure is accomplished.

The duration of these different stages will depend on the progress of the case, and should relapse take place one or other stage may require to be resumed after it had been abandoned. In cases where contraction has taken place Mr. Thomas discountenances all operative interference, and trusts to position and rest alone to bring the limb back to its normal condition. In these cases the splint is applied to the limb in its contracted condition, and the limb is gently persuaded to come back to its normal state. As the muscles yield and straightening takes place the instrument must be altered in shape and made to approach the natural line, which may be done by slackening the rivets at the various joints of the apparatus. In speaking of disease of the knee-joint Mr. Thomas claims even more satisfactory results as the effect of this treatment than those seen in hip-joint disease, the knee-joint being more easily controlled than the hip. In these cases the patient is enabled to walk about at an earlier period and can often attend to his ordinary occupation long before the joint has recovered. Here, also, as in morbus coxarius, position and the weight of the limb are sufficient to remove any deformity not the result of true anchylosis, no forcible extension being required. As regards the appliance used in these cases the author explains his practice as follows:—"The upper crescent is formed of a ring of iron three eighths of an inch thick and nearly ovoid in shape, covered with boiler felt and basil leather, for the upper and lower portions of which bud-iron rods pass down to the lower end of the machine, where may be noticed a small staple for retention purposes, in the commencement of the treatment. This staple is cut off at a subsequent stage, and replaced by a patten as at Pl. 4 fig. 7, which is welded on in its place for the use of the patient in locomotion. Across the two parallel bars is stretched an apron of basil leather to support the limb, in which are two slits for the insertion of the bandage (Pl. 12, fig. 4).

An exact diagram and side view of the nearly ovoid ring is shown in Pl. 4, fig. 8, from which the reader will perceive that the anterior crescent, B, is somewhat straighter than the posterior one, D, and that the inside stem, C, is connected anteriorly to the centre of the nearly ovoid ring, the stem, A, being connected to the centre of the top of the ovoid. The stem of the machine should extend for at least three inches below the foot." The annexed plate gives a view of the splints as applied in cases of knee-joint disease. The same splint is applicable in cases of disease of the ankle and tarsal joints, and yields results equally satisfactory. Mr. Thomas adduces many cases to exemplify the success of his practice, and affirms that if his splint were in more general use we would hear of far fewer cases of excision.

With regard to principle, the treatment proposed in this work is not new, rest having always been regarded as the essential point in the treatment of joint diseases. So long as the patient is confined to bed the long splint answers very well for keeping the joint fixed, and as a rule the results of its use are satisfactory while the treatment is continued. The great objections to its use are the pain arising from the continuous application caused by the pressure of the perineal band, and also the injurious effect on the general health produced by long confinement to bed. After some weeks' complete rest in bed a point is reached in the progress of the case when gentle exercise may be indulged in, with decided benefit to the general condition of the patient, and without producing irritation in the affected joint, provided the latter is kept perfectly fixed, and herein lies the great importance of the new splint. In treating hip-joint disease with the long splint, the ordinary practice is to remove the splint after the lapse of six weeks or two months if pain in the joint has ceased, confinement to bed for some

Fig. 4

Fig. 1

Fig. 2

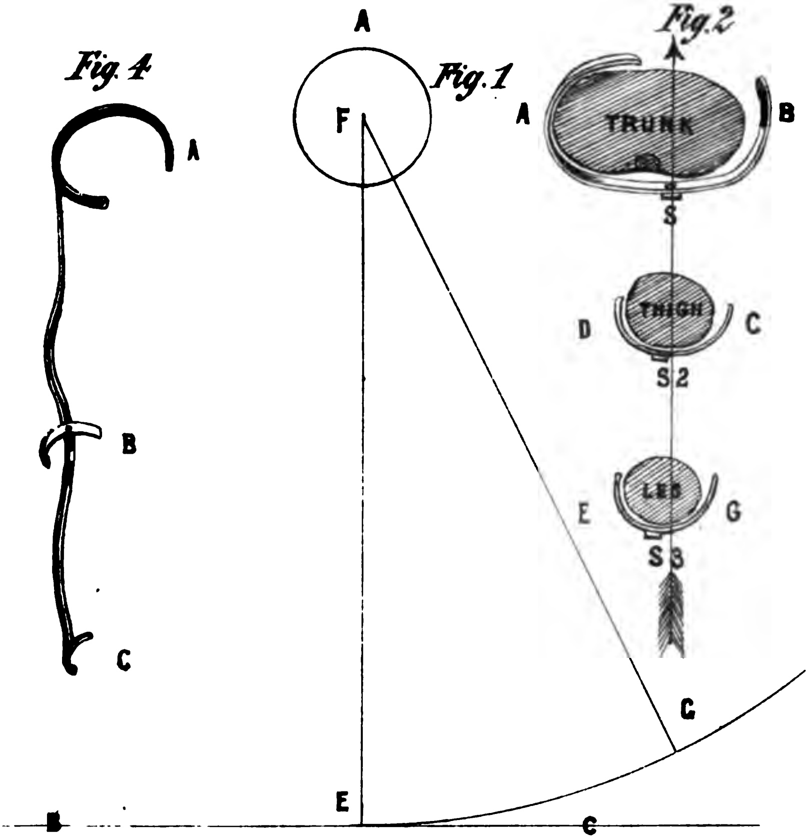


Fig. 3

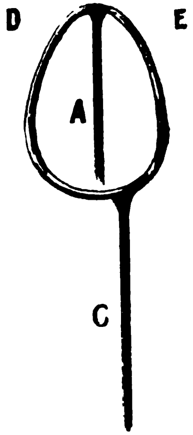


Fig. 5

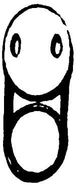


Fig. 6

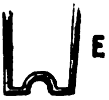
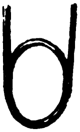


Fig. 7



weeks longer without the splint, and subsequent gentle exercise in carriage or perambulator. In cases where the latter part of the treatment can be carried out, and the patient is strictly prevented from walking for some months, the treatment is usually successful if the splint is kept on long enough in the first part of the treatment. The poorer classes, however, cannot provide themselves with perambulators or pony-carriages, but generally commence walking about as soon as the splint is removed, and as a consequence nothing is more common than to see patients who had been discharged from the hospital apparently cured return in the course of a few months as bad as ever. Drs. Davis and Sayre, of New York, are alive to the importance of treating the joint disease while the patient is allowed to walk about, but their apparatus is defective insomuch as it does not fix the trunk, and does not therefore prevent movement at the hip-joint. Mr. Thomas's appliance, then, without containing anything novel in principle, appears to be the most efficient means yet proposed for obtaining complete rest of the affected joint without confinement to bed. He deserves the thanks of the profession for his contribution to the mechanics of joint disease, and his book deserves to be carefully perused by every practical surgeon.

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